INDEX TO VOLUME 58

A-6 tin mine, Transvaal, 540
Actinolite, 335e
Adams, L. H., and Gibson, R. E., on fluid inclusion content, 182
Addie, G., on the two drill-hole problem, 618–621
Additional Measurements of Rotation Properties of Ore Minerals (Carpenter and Cameron), 1309–1312
Adler, H. H., and Kerr, P. F., on infrared spectra, 560
Adler, H. H., *Concepts of Genesis of Sandstone-Type Uranium Ore Deposits*, 839–852
Some Basic Considerations in the Application of Infrared Spectroscopy to Mineral Analysis, 558–568
Adler, I., and Barton, P. B., Jr., abstract by, 1191
Afanasiev, G. D., book reviewed by, 460
Africa, The Mineralogenetic Provinces of (Kun), 774–790
Age of mineralization, cave in rock district, 907–908
Analytical procedures, minor element analyses, 925
Age relationships, Guiana shield, Venezuela, 80
Age relationship of mineralization, 417
Ahfield, F., on Bulacayo stock, 981
Ahrens, L. H., on spectrochemical error, 1135
Alexandrov, E. A., reviews of *Geologiya Rudnykh Mestorozhdenii*, 148–155, 295–301, 462–468, 625–631, 818–824, 1009–1015, 1169–1174, 1355–1361
Algodonite, 487
-chalcocite, 489
Alkali content, spodumene pegmatite, 96
Allais, M., on statistical distribution of mineral deposits, 480
Alteration, Facies and Types of Hydrothermal (discussion), 808–811
mineralogical and chemical aspects of, in basic rocks, 334
near pegmatites, 90
wall-rock, 1294
Alteration Zoning, 1113
Altering solutions, gross nature of, 339
Ambrose, J. W., article discussed by, 811–814
Ames, L. L., Jr., *Kinetics of a Replacement Reaction*, 1229–1236
on fluid inclusions, 889
Ames, R. L., discussion by discussed, 804
Ampandramaika, 786
Ampanihy, 786
Amphibole, Cerro Bolivar, 226
Amphibolite, 82
conditions of formation, 738
Amstutz, G. C., on Sr-content of carbonates, 539
on syngenetic origin Southeast Missouri lead, 888
Analysis, of boron, 363
of calcium, 362
of chloride, 363
of lithium, 362
of magnesium, 362
of potassium, 362
of rock and minerals by reflected infrared radiation (Lyon and Burns), 274–284
of sodium, 362
some basic considerations in the application of infrared spectroscopy to mineral (Adler), 558–568
of sulfate, 363
analytical method, trace amounts of fluorine in silicate rocks, 946
Analytical problems with dithizone, 583
Analytical techniques, leach solutions from fluid inclusions, 894
Anderson, A. L., *Silver Mineralization in the Mineral District, Washington County, Idaho*, 1195–1217
Anderson, C. A., on tuffs in California as pozzolans, 715
Andes, hydrothermal developments in the (Kents), 1110–1118
Andradite, 1293
Andrews, T., on fluid inclusions, 189
Angola, mineralogenic belt, 787
Anisodesmic compounds, 561
Anistotropies, 1249
Ankerite, 552
Apalachicola, heavy mineral prospect, 1243
Apatite, 532, 553, 1294
A.P.I. project 49 kaolin clay reference locality, Mesa Alta, New Mexico, geology of (Reeves), 237–249
Apparatus, orienting of core, 1319
The application of thermoluminescence to geothermometry (Macdiarmid), 1218–1228
Arizona, manganese ore, 6, 7, 13, 14, 23, 33
oxidation of sulfide ores in the Mildren and Steppe mining districts, Pima County (Williams), 1119–1125
Arkansas, manganese, 15
Arnold, L. K., and La Rose, J. A., Jr., *Destructive distillation of carbonaceous Iowa shales*, 212–217
Arsenates of zinc and calcium, stabilility relations of some — (communications), 599–608

Arsenic, native, 490
Arsenopyrite, 491
-loellingite-arsenic, 491
-realgar, 492
Ashley, G. H., on variation in sulfur in coal, 721
Asken, G. F. R., discussion by, 618
As-S, binary system, 487
Assay data, Don Tomas, 1062
Aswathanarayana, U., Gangadharam, E. V., and Rao Rameswara, K., *Distribution of radioactivity in the Mosabonie copper mine, Bihar, India,* 506–514
Atlantic Rim, African mineralagenetic province, 786
Australia, data on cuprian coloradoite from Kalgoorlie, Western (Radtke), 593–598
Azurite, 126

B-mine (Nieuwpoort), Transvaal, 542
Baas Becking, L. G. M., on sulfides, 54
Baas Becking, L. G. M. and Moore, D., on sulfide minerals through bacterial action, 327
Bacteriogenic sulfides, 842
Bacteriologically produced sulfides in sandstone-type uranium ores, 842
Badger, R. M., on force constant of the bonds, 564
Baertsche, P., on isotopes of oxygen in carbonates, 988
Bailey, S. W., and Brown, B. E., on chlorite, 336
Bailey, S. W., and Cameron, E. N., on temperature of filling of fluid inclusions, 907
Bain, G. W., on epigenetic and syngenetic deposits, 319
Bain, H. F., on origin Miss. Valley deposits, 888
Bannister, F. A., on bravoites, 855
Baragar, W. R. A., on sphene replacing magnetite, 342
Barberton, 778
Bark Tissues, 1095
Barnes, H. L., article by discussed, 815
on erosion of vein minerals,, 1075
Ore solution chemistry I. experimental determination of mineral solubilities, 1054–1060
Barnes, R. B., et al., on frequency, atomic mass and force constant, 564
Barth, T. F. W., book by, reviewed, 469
on pegmatites, 104
Barton, P. B., Jr., and Toulmin, P., 3rd, abstract by, 1191
Barton, P. B., Jr., on activity ratios anions, 1077–1078
and Toulmin, P., Jr., on pressure gradients and ore deposition, 322
Basco, D. M., on Philippine stratigraphy, 111
Basin and Range quartz monzonites, copper, lead, and zinc in biotics from (Parry and Nackowski), 1126–1144
Bastin, E. S., on colloidal deposition, 1214
on inclusions of petroleum, 889
Bateman, A. M., on manganese ores, 434
Bates, J. D., *Heavy mineral reconnaissance, Florida west coast,* 1237–1245
Bateson, J. H., and Hardin, —, *A geochemical approach to the problem of bauxite genesis in British Guiana,* 1301–1308
Bauer, W. G., on pozzolans, 710
Baumann, L., on carbonates from Freiberg, 539
Bauxite deposits, 1006
critical factors in the genesis, extent, and grade of some residual (Grubb), 1267–1277
formed in two stages, 1003
in Jamaica, 63
of British Guiana and Surinam in relation to underlying unconsolidated sediments suggesting two-step origin (Moses and Michell), 250–262
in Surinam and British Guiana, genesis of (discussion), 1002–1007
of the world, 68
Bauxites derived from sedimentary clays, discussed, 1002
developed on limestones Jamaica type (discussion), 816–817
developed on Limestones, Jamaica type (Hose), 62–69
fossil, 1006
Bauxite genesis in British Guiana, geochemical approach to the problem of, (Hardin and Bateson), 1301–1308
Bauxite genesis in Jamaica (Chubb), communication, 286
Bauxite in certain industrial operations, the composition and constitution of red yellow soil earths that may be substituted for (communication), 138–142
Nassau Plateau, 1004
Bauxite, origin of, 262
subrecent to recent, 1004
terra rossas and limestones in the Mediterranean area, chemical analyses of, 68
Bauxite types, ages of the various, 1004
Bed, relaying phenomenon, 1249
Behnken, H. E., on carbon dioxide crystals, 188
Bell, J. A., and Jones, *A new technique for the laboratory coring of coal,* 791–795
Behre, C. H., Jr., abstract by, 1181
on bauxite formation, 1307
Belevtzev Ya. N., book by reviewed, 147
Belousov, V. V., book by reviewed, 147
book edited by, reviewed, 634
Belyakova, E. F., and others, book by reviewed, 146

Benato, 786
Beneficiation of manganese ore, 576
Bennington, K. O., on other oxides affinity for SiO_2, 756
Benzene, 1000
Berberati, 789
Bernard, J. H., and Paděra, K., on bravoites, 855
Beryllium, evaluation of deposits during prospecting and exploration work (Beus and Page), 156–157
Betekhtin, A. G., on arsenopyrite-realgar, 492
Betsiramy, 786
Beus, A. A., book by reviewed, 156
Bikita, 778
Billings, M. P., on fractures, 1157
Binary system, As-S, 487
  Cu-As, 487
  Fe-As, 490
Bingham stock, biotite, 1130
Biogenic sulfides, inorganic pyrite spheres, a further remark on (discussion), 998–999
Biotite, 1293
Biotites from basin and range quartz monzonites, copper, lead and zinc in (Parry and Nackowski), 1126–1144
Biotization, 1294
Bismuthinite, 540, 1292
Bixbyite, 437
Black Reef, silver percentage in gold, 961
Blanks, R. F., and Kennedy, H. L., on reactive aggregates as pozzolans, 716
Bleackley, D., on bauxite of British Guiana and Surinam, 1307
  on origin of bauxites, 1301
Blende, 920
Blondel, F., on statistical distribution of mineral deposits, 480
Bloom, H., articles by, discussed, 1001
Boger, R. E., on Badito cone uranium, 848
Bolivia, structural geology of Pulacayo mine (Lyons), 978–987
Borchert and Tröger, remobilization during palingenetic fusion, 1081
Borchert, Von H., on Kupferschiefer, 320
Bornite, 125
  -domeykite, 496
  Enargite, 494
  formation, 55
  -tennantite, 494
Botvinkina, L. N., book by reviewed, 146
Boulangerite, 1209
Boundary layer effects in fluid inclusion growth, 200
Bournonite, 1207
Bowen, J. M., and Wright, J. A., on Borneo geology, 114
Boydell, H. C., on colloform structures, 1214
Boyle, R. W., discussion by, 807
Bramlette, M. N., on bauxite in Arkansas, 1306
Brandt, R. T., on mineral zoning, 445
Braunite, 435
Bravoite, 854, 857
  breakdown of natural, 879
  geological implications, 880
  -pyrite assemblages, 882
  synthesis and stability relations, 873
  -vaesite assemblages, 882
Breccia pattern, 575
Breccia-pipe deposits of uranium, 849
Breccia-pipes, tourmalinized, 1117
Brecke, E. A., on Illinois fluorite, 174
Brett, R., abstract by, 1190
  on Lacorne Mine, 1340
Brewster, David, on fluid inclusions, 189
Brief comments on the art and science of Economic Geology (Rove), 477–482
British Guiana, geochemical approach to the problem of bauxite genesis in (Hardin and Bateson), 1301–1308
  and Surinam in relation to underlying unconsolidated sediments suggesting two-step origin, bauxite deposits of (Moses and Michell), 250–262
Brock, B. B., on Rhodesian Copperbelt, 378
Brock, M. R., and Heyl, A. V., Jr., on alkaline rocks in the midcontinent, 888
Brotzen, O., discussion by, 294
Brown, B. W., article discussed by, 816–817
Brown, H. S., on biotite N_γ index decreases toward ore zone, 762
Brown, J. S., on hydrothermal theory, 1080
Brummer, J. J., on Rhodesian Copperbelt, 375
Bucher, W. H., on the two drill-hole problem, 618–621
Buckley, E. R., on origin Miss. Valley deposits, 887
Buckley, H. E., on boundary layer effects in crystal growth, 200
Buddington, A. F., on sphene coronas on titaniferous magnetite, 342
  temperature related to TiO_2 content of magnetite, 739
Buhwa, 778
Bulawayo belt, 779
Burnham, C. W., article by, discussed, 808
Burns, E. A., and Lyon, R. J. P., *Analysis of rocks and minerals by reflected infrared radiation*, 274–284
Bushveld, 776
Butler, B. S., on Ibapah stock, 1134
  on sulfides, 1075, 1078

Calcite, 126, 918, 1209
Calcitic marl slate, 934
Calcium, stability relations of some arsenates of zinc and, (communications), 599–608
California, geology and technology of some natural pozzolans in North Central (Faick), 702–719
  manganese, 15, 24, 34

Calkins, F. C., on steel galena, 1084
Callahan, L. I., book by reviewed, 826
Cameron, E. N., and Carpenter, *Additional measurements of rotation properties of ore minerals*, 1309–1312
Rowe, R. B., and Weis, P. L., on distinguishing primary from secondary inclusions, 896
Rowe, R. B., and Weis, P. L., on fluid inclusions, 205
and Threadgold, I. M., on vulcanite, 1311
Cameroon-Ubangí mineralogenic belt, 789
Campbell, R., on titaniferous iron oxides altered to sphene, 342
Canadian research in economic geology, 622–624
Cannon, H. L., on zinc and lead in Lockport dolomite, 888
Cantwell, T., on statistics on ore bodies, 480
Carbonates, 539
Carbonatites, 446
average chemical composition of (communication), 988
Carbon dioxide hydrate in inclusions, 188, 190, 191
dioxide in fluid inclusions, 187
tetrachloride, 1000
Carpenter, R. H., paper by, discussed, 1345
Some vein wall rock relationships in the White Pine Mine, Ontonagon Co., 643–666
and Cameron, E. N., *Additional measurements of rotation properties of ore minerals*, 1309–1312
Carswell, H. C., discussion by, 811–814
Casasola, A. G., on Palawan geology, 113
Caspers, H., on formation of hydrogen sulfide, 722
Cassinga, 787
Cassiterite, 532, 548
Cave-In-Rock fluorite district, 890
Illinois, and upper Mississippi Valley zinc-lead district, composition of fluid inclusions (Hall and Friedman), 886–911
Central Rand, silver percentages, 958
Cerro Bolivar, Venezuela, the iron ores of (Ruckmick), 218–236
Cesium variations, spodumene pegmatite, 98
Ceylon, kaolin in (Herath), 769–773
Chalcocite, 126
Chalcocite, deposition of, 665
-digenite–enargite, 489
replaced, 661
-tennantite-enargite, 489
Chalcopyrite, 125, 539, 552, 920, 1203, 1342
-arsenopyrite, 495
and bornite, the low temperature synthesis in aqueous solution of (Roberts), 52–61
-domeykite, 495
Chalcopyrite—*Continued*
-enargite, 494
-tennantite, 494
Chapman-Brown, J., on cassiterite crystals, 535
Charnokite, 82
Chemical analysis of bauxite terra rossas and limestones in the Mediterranean area, 68
composition, manganese ores, 575
composition, checks on fluid inclusions, 901
data on bauxites, 1303
data profile, bauxite, 1303
properties, coal, India, 1092
Chemistry and petrography of the Marl slate of S.E. Durham, England (Hirst and Dunham), 912–940
I. experimental determination of mineral solubilities, ore solution (Barnes), 1054–1060
spodumene pegmatite, 96
Chert-spilite, Philippines, 109
Chico, R. J., abstract by, 1193
Chlorite, 293, 335
Chloritization, 1294
Chloroform, 1000
Choice of class of rocks sampled, 943
Choubert, B., Henin, L., and Bétrémieux, R., fermentation can cause migration of alumina, 1004
Chrysocolla, 126
Chuff, L. J., *Bauxite genesis in Jamaica*, 286
Clarites, 263
Clark, J. D., and Menaul, P. L., on sulfide minerals, colloidal, 1078
Clark, L. A., *The sulfur-rich portion of the Fe-Ni-S system*, 853–885
on system Fe-As-S, 491
Classification, Guiana bauxite deposits, 1003
Clayton Peak stock, biotite, 1132
Clemency, C. V., Hagner, and Collins, *Host rock as a source of magnetite ore, Scott Mine, Sterling Lake, N. Y.*, 730–768
Cleveland, J. H., and Vitaliano, C. J., abstract by, 1186
Climate, S.E. Johore, 1268
Cloke, P. L., discussion by, 1166
Closed-system model, 698
Coal macerals, studies on, 1347
studies on, Roy, M. M., 347–352
Coal, a new technique for the laboratory coring of (Jones and Bell), 791–795
Coals and the occurrence of marine roof beds, relationship between sulfur in (Williams and Kuth), 720–729
Coals, petrology of Talcher (Pareek), 1089–1108
the occurrence of resinite in bituminous (Jones and Murchison), 263–273

Coats, R. R., Goss, and Rader, *Distribution of fluorine in unaltered silicic volcanic rocks of the western conterminous United States*, 941–951
Cobalt and nickel in marl slate, 931
Collenette, P., on Borneo copper, 128
on Borneo geology, 114
Collinite, 1097
Collins, L. G., Clemency, and Hagner, *Host rock as a source of magnetite ore, Scott mine, Sterling Lake, N. Y.*, 730–768
on source of ore, the country rock, 762
Colloform structures, significance of, 1214
Colloform texture, 575
Colony, R. J., on magnetite intergrown with pegmatites, 736
Coloradoite from Kalgoorlie, Western Australia, data on, cuprian (Radtke), 593–598
Colorado, manganese ore, 8, 16, 24, 25
Colorado Plateau, 1150
syngenetic ore, 448
Communications—
The composition and constitution of red and yellow soil earths that may be substituted for bauxite in certain industrial operations (Richard), 138–142
Source of uranium in the Gas Hills area, Wyoming, (Guilinger), 285–289
Bauxite genesis in Jamaica (Chubb), 286
A three point method of orienting underground specimens (Faulkner), 441–443
Stability relations of some arsenates of zinc and calcium (Williams), 599
"Aureole" versus "Halo" (Tomkeieff), 601–603
Chemical kinetics and the formation of mineral deposits (Swayze), 604–605
Lead mineralization in the Abbottabad area, Hazara District, West Pakistan (Shams), 605–608
Mineralization in Cook County, Minnesota (Foster), 796–803
Thermal glow tests as a guide to ore deposits (Zeschke), 800–803
Average chemical composition of carbonatites (Gold), 988
Bacterial action on orpiment (Ehrlich), 991–994
Radiation surveys on non-radioactive deposits formed by descending solutions (Zeschke), 995–996
Fractures, joints, faults, and fissures (Mitcham), 1157–1158
Molybdenite paragenesis at the Lacorne Mine, Quebec (Renault), 1340–1344
Compaction of sediments, 1147
Compass corrections for reconnaissance mapping and geological prospecting in areas of magnetic disturbance, sun chart (Fraser), 131–137
Compositional relations of ore deposits, 322
Composition diagrams, 670
Composition of fluid inclusions, Cave-In-Rock fluorite district, Illinois, and Upper Mississippi Valley zinc-lead district (Hall and Friedman), 886–911
Composition, spodumene pegmatite, 97
Comucci, P., and Mazzi, F., on fluorine increase with increasing silica content, 943
Concepts of genesis of sandstone type uranium ore deposits (Adler), 839–852
Concretion formation and polarity, 1275
Confidence limits, calculated, 1068
Conglomerates, silver-gold ratios in some Witwatersrand (Hargraves), 952–970
Conklin, Nancy and Fleischer, Michael, with Hewett, D. F., *Deposits of the Manganese Oxides: Supplement* 1–51
Control of ore deposition, 127
Copperbelt, 779
is it a classic example of syngenetic deposition, The Northern Rhodesian (Gillson), 375–390
Copper extractant, 581
Copper in biotites, 1140
Copper, lead and zinc in biotites from Basin and Range quartz monzonites (Parry and Nackowski), 1126–1144
lead and zinc in the Marl Slate, 932
migration of, 665
Copper Mine, Bihar, India, distribution of radioactivity in the Mosaboni, (Gungadharam, Rameswara Rao, Aswathanara), 506–514
Copper mineral assemblages and zoning, 501
Copper mineral associations, 488
Copper, native, 126
Core logs, rock and magnetite ore, Sterling Lake, N. Y., variously analyzed, 736, 742, 744, 745, 746, 750, 752
Core orienting, general method, 1315
magnetic conditions, 1317
Coring of coal, a new technique for the laboratory (Jones and Bell), 791–795
Cornwall, H. R., on magnetite replaced by chlorite and sphene, 342
Cousins, C. A., on ratio of silver to gold in Witwatersrand, 954
Covellite, 126
Covellite-sulfur-enargite, 488
Cox, G. H., on origin Miss. Valley deposits, 887
Crank, J., on steady-state approximation, 1230
Creely, R. S., on tuffs in California as pozzolans, 715
on tuffs of California, 714
Criteria for distinguishing syngenetic, diplogenetic, epigenetic, and lithogene deposits, 318
Critical factors in the genesis, extent and grade of some residual bauxite deposits (Grubb), 1267–1277

Cronies, C., on training of geologists, 478
Cross, W., on manganese ores, 434
Crustal heat, hydration energy a possible contributor to (discussion), 1346
Crystal chemistry of micas, 1127
Cu-As, binary system, 487
Cu-As-S, ternary system, 487
Cubanite associations, 496
Cu-Fe-As, 493
Cu-Fe-As-S, system, 494, 694
Cu-Fe-S-O system, 670
Cu-Fe-S, ternary system, 485, 693
Cuthbert, M. E., on copper sulfides, 53
Cutinite, 1101
Cuyuna Range, 522
Cycles of Africa, 774
Cyclic accretion of uranium in sediments, 845
Cylindrite, 1207
Czamanske, G. K., on acid solutions, 1077

Dallmus, K. F., on basin subsidence, 1147
Damon, P. E., with Green, W. D., *Age of Cornwall, Pennsylvania magnetite ore* (discussion), 143–145
Daniels, F., on thermoluminescence, 800–803
Danse, A., on leaching of iron, 1271
Darnley, W. G., and Vaes, J. F., on Rhodesian Copperbelt, 388
Data on cuprian coloradoite from Kalgoorlie, Western Australia (Radtke), 593–598
Data, poor reproducibility with dithizone, 584
Davidson, C. F., books reviewed by, 146, 301, 460, 631, 1167, 1352
  on Co-Ni-ratios, 552
  on epigenetic origin of Mount Isa, 325
  on Marl Slate, 917
  on Rhodesian Copperbelt, 382
Davidson, D. F., and Lakin, H. W., on heavy metals in shale, 323
Davis, R. E., on chemical composition of pozzolans, 706
Deans, J., on Marl Slate, 913
De Jong, W. F., Willems, H. W. V., on bravoite, 857
DeKun, N., book reviewed by, 633
  discussion by, 447
de los Santos, V., on Palawan geology, 113
Deposits of the Manganese Oxides: Supplement (Hewett, Fleischer, and Conklin), 1–51
Derry, D. R., map reviewed by, 469
Desborough, G. A., *Magmatic sphalerite in Missouri basic rocks*, 971–977
  Mobilization of iron by alteration of magnetite-alvöspinel in basic rocks in Missouri, 332–346
Descriptive geometry of core orientation, 1320
Design of reaction vessel, furnace, and sampling valves, 1056
Destructive distillation of carbonaceous Iowa shales (Arnold and La Rose), 212–217
De Vletter, D. R., article discussed by, 1007
De Wiest, R. J. M., book translated by reviewed, 470
Diabase, Cerro Bolivar, Venezuela, 227
Diabase olivine, 333
Diagenetic modifications of iron formation, 519
Diagram of Au-Ag-Te system, 1164
Diagram, apparatus, kinetics of the replacement of gypsum, 1233
  bacterial solubilization, 993
  block, relation of orebody to aureoles and halos, 603
  bravoite breakdown on the FeS_2-NiS_2 join, 878
  all edge values of pyrite and vaesite, 866
  chemical composition of water, 427
  chemical and isotopic composition of fluid inclusions, 897, 899
  chemical variation elements across halos, 657–658
  chronologic plot, silver content, bullion, Crown Mines Ltd., 960
  chronologic plot silver content, bullion of Witwatersrand mines, 963
  comparison weathered material with bedrock, 1305
  composition minerals of the Fe-Ni-S system in atomic percent, 855
  composition, system Cu-Fe-As-S, 670
  construction of nomogram, 1338
  copper vs. radioactivity, 512
  correlation of cores based on trace element distributions, 927
  curve for breakdown of bravoite to pyrite + vaesite, 875
  descriptive geometry of core orientation, 1324
  distillation apparatus for shale, 213
  distribution of Ba^{+2} concentration, 1234
  distribution of fluorine in Cenozoic glassy silicic volcanic rocks, 947
  distribution of quartz, pyrite, and carbonate, Marl Slate, 923
  Don Tomas, paired values, silver and lead assay width products, 1065
  Don Tomas, vein paired values for silver and lead assay width products, 1066
  elements by ionic potentials, 1274
  equilibria in the system Cu-O-S-H_2O, 697
  fluid inclusion sampling train, 357
  fugacity, 670
  frequency distribution of indices of refraction of fused beads, 944
  frequency distributions, Mn/Fe ratios in iron formations and source rocks, 520
  glow curves, 1224
  glow curves of different minerals, 801

Diagram—*Continued*
grain size distribution, copper minerals across halos, 655
histogram, topographic control of bauxite deposits, 1271
infrared absorption spectra of carbonates and hydrous oxides, 560
infrared absorption spectra of sulfates, phosphates, arsenates and vanadates, 563
infrared spectra SiO_2 polymorphs, 275, 276
infrared spectra, various rocks and meteorites, 277, 278, 279, 281
kinetics for the replacement of gypsum, 1233, 1235
"kriging" of ore block samples, 1260
linear and planar structural elements, Transvaal tin mines, 408
meridional stereonet solution of the two hole problem, 812
Mn/Fe ratios and $Fe^{++}/^{+++}$ ratios in iron formations, 522
model for the replacement of gypsum, 1231
nomographic solution of problems, 1328, 1329, 1331, 1333, 1335, 1337
paragenetic sequence at Kalgoorlie, 594
paragenetic sequences, Sandong tungsten mine, Korea, 1298
percent magnetite plotted against distance from ore zone, 763
percent silver in bullion beads, 957
phase assemblages Fe-Ni-S, 864
phase assemblages in fluid inclusions, 192
phase, calculated, natural arsenates, 600
phase, Eh-pH, Pb-Mo system, 1122
phase relations between pyrite and vaesite, 869
phase relations in Cu-Fe-As-S system, 677, 679, 681, 687, 695
phase relations of Cu-Fe-S-O system, 671–672
phase relations, Fe-Ni-S system, 862
phase relations in the system Cu-Fe-S, 682, 683, 686, 693
phase relations in system Pb-Zn-S, 691
pressure-temperature, pyrite and vaesite, 866
radiometric traverse across an outcrop of manganese ore, 995
rate of thermoluminescence drain, 1222
relation between indices of refraction of beads, and silica percentage, 945
relationship between Co, Ni, Cu, Mo, Pb and organic carbon, 928
relationship between Sr and dolomite, 934
Rooiberg arkosites in Pettijohn triangle, 528
and section, glow test results at a contact metasomatic iron deposit, 802
silver percentage in bullion, 955
specimen orientation scheme, 442
Diagram—*Continued*
stability relation of copper and silver halides, 1123
statistical, lead content of biotites, 1138
statistical, zinc content of biotites, 1139
statistics, copper content of biotites, 1137
stereographic, fracture pattern Rooiberg, Transvaal, 397
stereographic solutions of the 2 drill hole problem, 620
theoretical glow aureoles around ore deposits, 801
a thermodynamic system vein model, 689
thermoluminescence, 1223
thermoluminescence glow curve of limestone, 1220–1221
time versus composition curves, 871
trace element content, Marl Slate, 924
vaesite solvus in ln (x) versus 1/T plot, 871
variations in N_2 index of biotite, 761
variation of orthoclase, albite and CO_2, content of arkosites, 530
variation in trace element content with core thickness, 928
variograms, 1250, 1251
vein model, 689
Diamond drilling, Balabac Island, Philippines, 120
Diamond drill logs, graphic, Guiana bauxite belt, 253, 255
Diffusion, 664
Diffusion in the solid state, 1084
Digenite-covellite-enargite, 488
Dilational features, 997
Dillon, J. S., on tuffs in California as pozzolans, 715
Dimorphite, 487
Diopside, 1293
Diplogenetic deposits, characteristics of, 329
Diplogenetic, syngenetic, lithogene, and epigenetic deposits (Lovering), 315–331
Discussions—
Age of Cornwall, Pennsylvania magnetite ore (Green and Damon), 143–145
Bauxite deposits of British Guiana and Surinam in relation to underlying unconsolidated sediments suggesting two-step origin (Doeve and Meijer), 1160–1162
Bolivian tin mineralization (Ljunggren and Radelli), 1348–1350
Bolivian tin mineralization and orogenic evolution (Schneider-Scherbina), 456
Carbonatites (de Kun), 446
Classification of copper deposits, a proposed (Gilmour), 618
Facies and types of hydrothermal alteration (Homley and Hostetler), Burham, 808–811
A further remark on biogenic sulfides; inorganic pyrite spheres (Steinike), 998–999

Discussions—Continued
Genesis of bauxite deposits in Surinam and British Guiana (de Vletter), Moses and Mitchell, 1002–1007
Hydration energy, a possible contributor to crustal heat (Cate), 1346
Hydrothermal vs. syngenetic (Woakes), 444
Hydrothermal vs. syngenetic theories of ore deposition (Askew), 614–618
Hydrothermal vs. syngenetic theories of ore deposition (Garlick), 447–456
Hydrothermal versus syngenetic theories of ore deposition (Gilmour), 145
Hydrothermal versus syngenetic theories or ore deposition (Schmitz), 609–614
Hydrothermal versus syngenetic theories post-Katanga batholiths in Northern Rhodesia (Phillips), Sales, 292–294
Jamaica type bauxites developed on limestone, (Brown), 816–817
Ore Knob massive sulfide copper deposit, North Carolina, The (Kinkel), discussion of discussion by Hutchinson, 1159–1160
Ore Knob massive sulfide copper deposit, North Carolina: an example of recrystallized ore (Hutchinson), Kinkel, A. R., Jr., 997
The origin of the gold-quartz deposits, Yellowknife, N.W.T. (Boyle, Wanless, and Lowden), 804
The Reocim deposits; Santander, Spain and their bearing on the Mississippi-Alpine type of lead-zinc deposit (Brotzen), 294
A simplified stereographic projection solution of the two drill hole problem, (Mills), 618
Studies on coal macerals (Mukherjee), 1347
Studies on the oxidation of magnetite and goethite, a reply (Gokhale), 291
Synthetic and natural phases in the system Au-Ag-Te (Cloke), 1163–1166
Thermoelectricity and resistivity of pyrite from Renison Bell and Mt. Bischoff, Tasmania (Gilfillan), 290
Thermoelectricity and resistivity of pyrite from Renison Bell and Mt. Bischoff, Tasmania (Hill and Green), 1162–1163
Toxic properties of several organic solvents used in geochemical exploration (Bloom), 1000–1001
Two more solutions of the two drill hole problem (Ambrose and Carswell), 811
The use of thermodynamic laws for the explanation of mineral zoning (Kudenko and Stetsenko), 815
Vein-wall rock relationships, White Pine Mine (Joralemon), 1345–1346
Distribution of the chemical elements with manganese, 39–47
Distribution of the chemical elements with manganese—*Continued*
of fluorine in unaltered silicic volcanic rocks of the western conterminous United States (Coats, Goss and Rader), 941–951
of metals in the Don Tomas Vein, Frisco Mine, Chihuahua, Mexico (Koch, Jr., and Link), 1061–1070
of radioactivity in the Mosaboni copper mine, Bihar, India (Gangaharam, Kameswara and Aswathanarayana), 506–514
Dithizone, 1000
fading of, 584
field tests, applicability of, 585
field tests (Hawkes), 579–586
yellowing of, 583
Dodd, P. H., on precipitants of uranium, 1149
Doelter, C., and Leitmeier, H., on bravoite, 855
Doeve, G., discussion by, 1160–1162
Doeve, G., and Meijer, W. O. J. G., discussion by, 1160
Dolomite, 919
Dombrowski, H. J., on bacteria from fluid inclusions, 184
Domeykite, 487
-arsenopyrite, 495
-chalcocite, 489
Dorr, J. Van N., abstract by, 1185
Don Tomas Vein, 1061–1062
Doyle, R. G., abstract by, 163
Drawing, core orienting procedures, 1321
Drawings of thin section of Marl Slate, 917
Drill core, orientation of small diameter (Zimmer), 1313–1325
Drillhole problem, a simplified stereographic projection solution of the two (discussion), 618–621
Dudykina, A. S., on trace element content of cassiterite, 536
Dunham, K. C., and Hirst, *Chemistry and petrography of the Marl Slate of S.E. Durham, England,* 912–940
Dunn, J. A., on braunite from garivide, 435
on Masaboni Mine, 508
Durain, 1097
Durites, 263
Dyhek, J., book by, reviewed, 634

Eardley, A. J., book by, reviewed, 825
Earth resistivity survey, 119
East Africa mineralogenetic province, 783
East Rand Basin, silver content, 957
Eckel, E. C., on tuffs in California as pozzolans, 715
Economic geology, a new nomogram for the solution of problems in structural (Leney), 1326–1339
brief comments on the art and science of (Rove), 477–482

Economic geology—Continued
of a part of the Hillsboro, New Mexico, mining district (Reeves), 1278–1284
Economics, New Mexico kaolinite, 245
Ehrlich, H. R., *Bacterial action on orpiment* (communication), 991–994
Electromagnetic survey, Balabac Island, Philippines, 118
Elliot, J. F., and Gleiser, M., on free energy data for Cu_2S and CuS, 676
Ely district, biotite, 1131
Emeralds, inclusions in, 203
Emmons, R. C., and Jones, J. B., on iron mobilized as a chelate, 1078
Emmons, W. H., on zonal arrangement of major ores, 322
Enargite, 488
-realgar-orpiment, 489
England, chemistry and petrography of the Marl Slate of S.E. Durham (Hirst and Dunham), 912–940
Energy source and concentration of ore, 754
Engulfment of old veins by invading magma, 1073–1074
Enugu, 790
Epidote, 1293
Epigenetic, diplogenetic, syngenetic, and lithogene deposits (Lovering), 315–331
Eugster, H. P., on system Fe-Si-O-H, 738–739
Eteke, 788
Evans, D. L., on deep sphalerite in Kansas, 174
Evensen, C. G., and Gray, J. B., on Colorado Plateau, 448
Everhart, D. L., on hydrothermal type deposits of uranium, 847
Evernden, J. F., on K-Ar age of Bolivian rocks, 1349
Exinite, 263, 347
1099
pyridine extract of, 349
Experimental applications, ore solubility apparatus, 1059
Experimental details, copper sulfide synthesis, 54
Experimental determination of mineral solubilities, ore solution chemistry (Barnes), 1054–1060
Experimental procedures, 1127
Experimental results, Fe-Ni-S studies, 860
thermoluminescence experiments, 1223
Extraction of metal from sample with dithizone, 582

Faber, H., on fluid inclusions for analysis, 889
Faick, J. N., *Geology and technology of some natural pozzolans in north central California*, 702–719
Fanale, F. P., and Kulp, J. L., discussion of article by, 143–145
Faulkner, E. L., *A three point method of orienting underground specimens*, (communication), 441–443
Faulting, Pulacayo, Bolivia, 983
Faults, fissures, fractures and joints (communication), 1157–1158
Fe-As binary system, 490
Fe-As-S ternary system, 491
Feely, H. W., and Kulp, J. L., on anaerobes in cap-rock carbonate, 842
Feldspars, 531
Fe-Ni-S system, the sulfur rich portion of the (Clark and Kullerud), 853–885
Fenner, C. N., on chlorides of ore-forming metals, 1080
Fermor, L. L., on manganese ores, 434
Ferrobacillus ferrooxidans, 991
Ferrous-ferric analyses of rocks and minerals, 749
FeS_2-NiS_2 binary join, 867
Fe-S system, 856
Field applications, thermoluminescence, 1225
Field investigations, 478
Field procedure, 580
Figure, bauxite on karsted lower Miocene limestone, Jamaica, 66
Boehmitic bauxite on limestone, France, 67
drawing of t thin section, 607
halo of copper minerals around a vein, 654
micro, greisenized rocks, 589
micro, surfaces showing coloradoite, 594
native copper around a vein, 652
from polished specimens of "ore shale" from Roan Antelope, 612
Fiser, D. J., on the two drill-hole problem, 618–621
Fisher, Walther, review of book by, 155
Fissures, fractures, joints, and faults (communication), 1157–1158
Fitch, F. H., on Borneo geology, 113
Fleischer, Michael, and Conklin, Nancy, with Hewett, D. F., *Deposits of the Manganese Oxides: Supplement*, 1–51
Fleischer, Michael, and Robinson, on increase in fluorine content with silica, 943
Florida west coast, heavy mineral reconnaissance (Bates), 1237–1245
Flotation, 577
Fluid inclusion analysis results, 364
Fluid inclusions, boundary layer effects on, 200
Cave-In-Rock fluorite district, Illinois, and upper Mississippi valley zinc-lead district (Hall and Friedman), 886–911
composition of, 896
crushing and collection and analysis of gases, 356
III: extraction and quantitative analysis of inclusions in the milligram range, studies of (Roedder, Ingram, and Hall), 353–374

Fluid inclusions—*Continued*
II. freezing data and their interpretation studies of (Roedder), 167–211
leaching of nonvolatile constituents, 359
microanalysis of, 361
organic fluids in, 201
sample selection and preparation, 354
vacuum crushing, 367
Fluorescent X-ray analysis for total iron, 745
Fluorine in unaltered silicic volcanic rocks of the Western conterminous United States, distribution of (Coats, Goss and Rader), 941–951
Fluorite, 364, 553
inclusions in, 180, 364, 367
Fluorspar "coontail," 1049
Fluorspar deposit classes, 1038
Fluorspar deposits, regional history and genesis of, 1051
Fluorspar, Northern Coahuila, Mexico, manto deposits of (Temple and Grogan), 1037–1053
Folding, Pulacayo area, Bolivia, 982
Formation fluid, expulsion of, 1147
Formation of, manto deposits, 1049
ore deposits by water of compaction (Noble), 1145–1156
Formation water as a source of metals, 1146
Foster, M. D., on iron-rich chlorite, 338
Foster, R. L., *Mineralization in Cook County, Minnesota* (communication), 796–803
Fowler, A., on Marl Slate, 915
France, boehmitic bauxite on limestone, 67
Fraser, D. C., *Sun chart compass correction for reconnaissance mapping and geophysical prospecting in areas of magnetic disturbance*, 131–137
on peat swamp, 327
Freas, D. H., late generation of quartz, 890
Free energies of adamite, austinite, and legrandite, 599
Free energy values for arsenates, 599
Freezing temperatures, fluid inclusions, depression of, 901
Friedman, I., on deuterium concentration of water from volcanic glasses, 905
Friedman, I., and Hall, *Composition of fluid inclusions, Cave-In-Rock fluorite district, Illinois, and upper Mississippi valley zinc-lead district*, 886–911
Fugacity diagrams, 670
Cu-Fe-S system, 682
Cu-Fe-As-S system, 686
Cu-Fe-S-O system, 688
Fugacity, compositions diagrams Cu-Fe-As-S system, 676
Fugacities vs. composition of the ore-forming solution, 696
Fulda, E., on Kupferschiefer, 936
Fungurume, 780
Furon, R., book by reviewed, 1017
Fusain, 1105
Fusinite, 1101
Fusinized resins, 1101
Fusinites, 347
Fusinite, pyridine extraction of, 349

Gabbro olivine poor, 333
Gabon, mineralogenic belt, 788
Gableman, J. W., and Boyer, W. H., on uranium deposits in breccia pipes, 849
Gaines, R. V., on tennantite-enargite, 489
Galena, 540, 920, 1205
and sphalerite, 553
fluid inclusions in, 364
Galungo alto, 788
Gangadharam, E. V., Kameswara Rao K., and Aswathanarayana, A., *Distribution of radioactivity in the Mosaboni copper mine, Bihar, India*, 506–514
Garlick, W. G., discussion by, 456
on Rhodesian Copperbelt, 376
on Roan Antelope, 328
Garrels, R. M., on mineral stability in terms of Eh and pH, 599
on uranium carried as carbonate complexes, 1147
on ore fluid, 1076
on sulfide transport, 1075–1076
Garrels, R. M., Krauskopf, and Marchandise, on stability fields of sedimentary manganese minerals, 515
Garrels, R. M., and Dreyer, R., on sulfide complex ions, 1077
on time for galena to replace limestone, 758
Gas and vapor transport, 1083
Gas chromatography of shale distillate, 213
Gaseous transfer, distillation and, 1079
Gaudin, A. M., and Dicke, G., on tennantite-realgar, 490
on tennantite and chalcocite, 488
Gaudin, A. M., Fuerstenau, D. N., and Mao, G. W., on sphalerite activation, 57
Gavenlin, S., on loellingite, 492
General geology of the Sterling Lake area, N. Y. and N. J., 732
Genesis, extent, and grade of some residual bauxite deposits (Grubb), 1267–1277
of residual bauxite deposits, 1269
of sandstone type uranium ore deposits, concepts of (Adler), 839–852
spodumene pegmatites, 100
Genetic considerations, mineral district, Idaho, 1213
Geochemical approach to the problem of bauxite genesis in British Guiana (Hardin and Bateson), 1301–1308
Geochemical exploration, toxic properties of several organic solvents used in, (discussion), 1000–1001
Geochemical and mineralogical controls of copper mineralization, 660–661
Geochemical prospecting with dithizone, 579–586

Geochemistry, 479
of ground water, 426
of ground water in the coastal region of Midnapur, West Bengal, India, occurrence and (Singhal), 419–433
of igneous rocks, sphalerite and the, 973
Rooiberg and Leeuwpoort tin mines, Transvaal, South Africa, 527–557
Geologic cross section, Pulacayo, Bolivia, 980, 981, 982, 986
formations, Koraput manganese district, India, 572
setting, mineral district, Idaho, 1198
setting, N.W. Malaya, 587
Geological map, Buenavista Encantada district, 1042
Geology of, API project 49 kaolin clay reference locality, Mesa Alta, New Mexico (Reeves), 237–249
and clay deposits of Ceylon, 769–773
and mineral deposits of east central Balabac Island, Palawan Province Philippines (John), 107–130
and origin of Sangdong tungsten mine, Republic of Korea (John), 1285–1300
and technology of some natural pozzolans in North Central California, (Faick), 702–719
as a science, 477
of Ore Deposits, see *Geologiya Rudnykh Mestorozhdenii*
general, Hillsboro district, 1279
general, Korean sheelite deposit, 1286
general, manganese mines, India, 571
general, of S.E. Johore, 1267
general regional, Pulacayo mining district, Bolivia, 979
general, Rockland area, Maine, 88
general, Talcher coal field, Orissa, India, 109
Jamaica bauxites, 63
Midnapur coast, West Bengal, India, 420
of the Northern Rhodesia Copperbelt (discussed), 444
of the Northern Rhodesian Copperbelt (Mendelsohn ed.), critically reviewed by Gillson, J. L., 375–390
of the White Pine deposit, 645
of the Northern Rhodesia Copperbelt (Mendelsohn) (discussed), 447
petrology and iron deposits of the Guiana shield, Venezuela (Stam), 70–82
Rooiberg and Leeuwport tin mines, Transvaal, 393
Geologiya Rudnykh Mestorozhdenii
(Geology of Ore Deposits) in Russian, reviewed in English by Alexandrov, E. A., 148, 295, 462, 625, 818, 824, 1009, 1169, 1355
Andrushchenko, P. F., *Conference on the preparation of metallogenetic and prognostic maps of supergene nickel deposits*, 1014
Geologiya Rudnykh Mestorozhdenii—Continued
Aristov, V. V., Petrova, M. G., Korolev, B. N., Belov, P. T., Gushchin, V. A., *Structure, mineralization, and conditions of formation of the Sherlovaya Gora granite intrusion*, 150
Arkhangel'skaya, V. V., *The relation in time of lead-zinc mineralization to quartz diorites of the Savinskaye No. 5 deposit in the eastern Transbaikal region*, 1013
Balitskii, V. S., *Rearrangement phenomena of mineral matter in ores of the Laura copper deposit*, 823
Baranov, E. N., Vertepov, G. I., and Gladyshev, G. D., *Wall rock alterations in a uranium deposit*, 1170
Barkovskaya, M. B., *Some features of the formation of economic grade heavy minerals concentration in basins of deposition*, 1357–1358
Barodayevskaya, M. B., and Prushinskaya, E. Ya., *Genesis of the breccia type sulfide texture in rocks of the 19 Parts'yezd deposit (Southern Urals)*, 298
Betekhtin, A. G., Godlevsky, M. N., *Contribution of M. V. Lomonosov to the study of ore deposits*, 153
Bindeman, N. N., *Types of hypogene mineralization in the Shilka-Arbagur region and the Novoberezovskaya depression (eastern Transbaikalia)*, 1012
Biryukov, V. I., *Classification of exploration systems of mineral deposits*, 300
Blenov, V. A., Dyesbyuk, K. A., Kuzmina, L. S., and Odokii, B. N., *Concentration of titanium in volcanic-sedimentary formations of the Yastrebovskii horizon in the southern part of the Voronezh region*, 1360
Bobrov, V. A., *Age of tungsten and molybdenum mineralization in the Yugodzyr region*, 628
Chainikov, V. I., *Paragenesis of cassiterite-sulfide ores*, 465
Dokov, R. D. Popov, A. G., Georgiyev, G. I., and Mikhailov, I., *The morphological features of metasomatic bodies of some lead-zinc deposits in the region of Madan*, 820
Dubrova, I. V., and Filimonova, A. A., *Lead sulfosalts from the deposit of Severnyi Kantau (Central Asia)*, 630
Dubrova, I. V., *Uranium-bearing solid bitumens in effusive rocks*, 154
Feklicker, V. G., *The method of measuring the optical constants of opaque minerals in small areas according to Drude's method*, 823
Fin'ko, V. I., and Magidovich, V. I., *Porcelainites of the Gusevskoye deposit in the Maritime Territory (Primorskii Krai)*, 631

Geologiya Rudnykh Mestorozhdenii—Continued
Firsov, L. V., *The structure and origin of quartz nodules from some ore-bearing fields of the Yana-Kolyma gold-bearing belt*, 299
Flerov, B. L., Bulayevsky, D. S., Dorofegey, D. A., *The geological position of lead-zinc deposits in the region of the Southern Verkhoyansk Range*, 465
Frolov, A. A., *Fractures of tectonic origin in ultrabasic rocks and carbonatites*, 464
Frolova, K. E., *Application of collodion replica in the study of polished sections*, 1173
Galdin, N. E., *Textural features of the barite aggregates in sulfide ore of the Belousovskoye deposit*, 1011
Gavrikov, S. I., *The occurrence of gold in sedimentary rocks containing disseminated sulfides in the El'ga River basin*, 468
Grabovskii, M. A., Zherdenko, O. N., *Investigation of ore minerals by magnetic powder application*, 1359
Grigorchuk, G. Yu., *Some phenomena of the hypogene replacement of minerals in lead-zinc ores*, 824
Gritsayenko, G. S., and Frolova, K. E., *Study of ore minerals by means of electron microscopes*, 1359
Ikornikova, N. Yu., *The role of chlorides in the hydrothermal transportation of metals during the mineralization process*, 1011
Kalinin, V. V., *Metamorphism of ores and country rocks in the deposit of Karadzhal (Central Kazakhstan)*, 1172
Kazansky, V. I., *Metasomatism of rocks around some faults in Malyi Khingan*, 1169–1170
Kazansky, V. I., *Problem of the primary source of gold in Malyi Khingan*, 468
Kazitsyn, Ya. V., and Aleksandrov, G. V., *A reply to the critical discussion by G. T. Volostnykh of the paper entitled "The metasomatic zoning during argillitization of granite porphyries near the ore bodies,"* 1014
Khain, V. E., *The tectonic background of the distribution of metallogenetic regions within folded zones*, 819–820
Klenov, A. D., *Hydrothermal helvite mineralization in quartz veins*, 629
Kornilov, N. A., *Quartz in the copper-nickel sulfide ores of Pechenga*, 824
Korolev, D. F., Miguta, A. K., *Distribution of uranium in sandstones*, 152
Korzhinskii, D. S., *Behavior of water during magmatic and postmagmatic processes*, 1009–1010
Korzhinsky, A. F., *The effect of the composition of hydrothermal solutions and country rocks on ore deposition in*

Geologiya Rudnykh Mestorozhdenii—Continued
some tungsten and lead-zinc deposits, 297
Kravchenko, G. G., *The problem of structural conditions of the formation of chromite deposits of the Kempirsai massif*, 821
Kreiter, V. M., *Classification of the exploration systems of mineral deposits by V. O. Biryukov*, 824
Kristal'nyi, B. V., *Stages in the process of endogenetic mineralization within the ore-bearing zones of the Chorukh-Dairon ore-bearing field*, 1357
Krotov, B. P., *Conditions of formation and distribution of Devonian bauxites in the greenstone belt of the Urals*, 627
Kukharenko, A. A., and Dontsova, E. I., *The problem of genesis of carbonatites*, 463
Kushnarev, I. P., *Depth of formation of endogenetic deposits in the structural facies of the Kuraminskii Range zone and the role of erosion level in the distribution of these deposits*, 148
Laverov, N. P., Tarashchan, A. N., Vlasov, B. P., and Pudan, G. F., *Application of the method of thermoluminescence in determining the relative age of granitoids*, 153
Laverov, N. P., Vlasor, *Zoning in distribution of hydrothermal deposits in connection with evolution of faults existing for long periods of time*, 1169
Lebedev, A. P., *The ore-bearing olivinites of the Svarants deposit in southern Armenia as a specific type of magmatic iron ore*, 1173
Lisitsina, G. A., Omel'yaneneko, B. I., and Randonis, P. A., *Low temperature quartz-albite rock alteration near uranium ore bodies*, 1355–1356
Lur'ye, L. M., *Metasomatic zoning of wallrock alteration in the Zambarak deposit*, 1356–1357
Main problems in the study of ore deposits in the Soviet Union, 295
Main problems of increasing the reserves of iron ore in the U.S.S.R., 818–819
Malinovsky, E. P., Ignatovich, V. I., *Structure of the tungsten-bearing stockwork of Inkur*, 466
Narshtien, G. Sh., *The role of porphyry dikes in the process of formation of the skarn copper deposits of Tur'inskoyi*, 630
Novorossova, R. E., and Komarova, G. N., *The solubility of tin ores of the Dzhabinda deposit and solubility of cassiterite in acids*, 300
Nekrasov, I. Ya., and Gamayanin, G. N., *Mineral associations and conditions of the formation of cobalt deposits in northwestern Yakutia*, 1171

Geologiya Rudnykh Mestorozhdenii—Continued
Ontoyev, D. O., *Conditions of formation of the ore-bearing veins in the deposit of Bukuka*, 628
Ostrovskii, I. A., *General regularity of water solubility in silicate melt*, 1357
Pavlov, D. I., and Timofeyev, R. L., *The possible contribution of haloids to the formation of endogenetic iron deposits*, 631
Pelymskii, G. A., and Kashpirov, S. N., *The association of uranium mineralization in hydrothermal veins with pyritiferous rocks*, 822
Petrovskaya, N. V., and Grinenko, L. N., *Study of the isotope composition of elements in connection with the problem of genesis of ore deposits*, 462
Petrov, V. P., *The mineral composition and genesis of bauxite and other products of lateritic weathering*, 821
Pavlov, D. I., *The distribution of chlorine in rocks and minerals and its role in the formation of endogenetic iron ores*, 1361
Pilava, N., *Sulfide deposits of Central Sweden*, 1360
Problem of the geological investigation of metallic and non-metallic mineral deposits, 1355
Pshenichnyi, G. N., and Shadlun, T. N., *The banded and schistous structure of ores in the Gaiskoye deposit of the southern Urals*, 1172
Rafal'skii, R. P., and Kudinova, K. F., *Experimental study of the conditions of deposition of uranium oxides by hydrothermal solutions*, 1171
Rakcheyev, A. D., *The thermoluminescence of minerals and rocks and its contribution to geology*, 1013–1014
Riib, M. G., and Makeyev, B. V., *Metasomatic zoning near the quartz-tourmaline veins (Myao-Chan region)*, 151
Safonov, Yu. G., *The special geological compass "Meopta,"* 1014
Sapazhnikov, D. G., and Viselkina, M. A., *The exogenetic uranium deposit associated with continental red beds*, 626
Satpayev, K. I., *Principal results of the comprehensive geological study and the problems of genesis of the Dzezkazgan deposits*, 625–626
Shcherbin, S. S., and Osetrov, O. A., *Primary halos of dispersion of rare elements around pegmatites as criteria in prospecting for concealed mineralization*, 152
Scherbin, S. S., *Ratios of tantalum to beryllium in some pegmatite bodies*, 466
Shikhtman, P. A., Povarov, A. V., and Maripov, T. M., *The morphological features of ore bodies of the Kansai*

Geologiya Rudnykh Mestorozhdenii—Continued
lead-zinc deposit and methods of their exploration, 823
Sher, S. D., and Demchenko, A. V., *The importance of morphological study of pyrite metacrystals in prospecting for gold deposits in the Lena region*, 822
Schmidt, A. I., *Age relations of pyrite and gold-lead-zinc mineralization in the Kurosan ore-field*, 149
Shnyukov, E. F., *The geological conditions of the formation of manganiferous oolites in ores of the south Ukrainian manganese basin*, 1013
Shterenberg, L. E., Berkhin, S. I., and Muraveiskaya, V. G., *Method of study of the manganese carbonate ores*, 467
Shternberg, A. A., *The state of water in the supercritical region in connection with the problems of mineral formation at great depths*, 1010–1011
Sokolova, E. A., *Some diagenetic structures in manganiferous rocks*, 1358
Solov'yeva, F. I., *Copper mineralization in Precambrian formations of the Ukrainian crystalline shield*, 1360
Strona, P. A., *The problem of sources of the low-temperature hydrothermal mineralization in the eastern Transbaikal region*, 822
Study of the isotope composition of elements in connection with the problem of genesis of ore deposits, 462
Sukhanova, E. N., *Some factors determining the nature of mineralization in intrusions of the Noril'sk type which are important in prospecting for copper-nickel ore*, 1358–1359
Timkhov, K. D., *Distribution of copper sulfide, titanomagnetite, and apatite mineralization in the Valkovskoye deposit (Middle Urals)*, 296
Tokhtuyev, G. V., and Kazak, V. M., *Experience with the morphological study of ore bodies in the Krivoi Rog basin*, 629
Troshchenko, V. N., *Some features of the geology and genesis of mercury deposits in the northern border of the Chuyo Steppe in Gornyi Altai*, 1012
Vasil'kova, N. N., and Kuz'men, V. I., *Alteration of datolite-bearing rocks in the supergene zone*, 152
Vishnevskaya, L. M., Zak, S. Sh., and Poplavko, E. M., *Rhenium-bearing lead-copper ores of the Dzhezkazgan deposits*, 154
Yumikov, B. A., and Latysh, I. K., *Products of oxidation of ulvöspinel*, 824
Zavarzin, A. V., *Conditions of occurrence of brannerite in quartz-pyrite-sericite metasomatic ore bodies*, 150
Zhabin, A. G., and Gaidukova, V. I., *The interrelation of niobates—pyro-*

Geologiya Rudnykh Mestorozhdenii—Continued
chlore, fersmite, and columbite—in alkaline syenite and carbonatite rocks, 299
Zlenko, B. F., *Wall-rock alteration and stages of mineralization in the Vavilenskoye deposit (Rudnyi Altai),* 295
Geophysical prospecting, Balabac Island, Philippines, 118
Geophysical prospecting in areas of magnetic disturbance, sun chart compass corrections for reconnaissance mapping and (Fraser), 131–137
Geophysics, 479
Geostatistics, principles of (Matheron), 1246–1266
Geothermometer, modified, 1224
Geothermometry, the application of thermoluminescence (MacDiarmid), 1218–1228
Gersdorfite, 541
Gilfillan, J. F., discussion by, 291
discussion by discussed, 1162–1163
Gill, J. E., on sulfides slightly volatile, 1082
Gill, P. A., discussion of discussion of paper by, 1162–1163
Gillson, J. L., on sphene in altered granodiorites, 342
The Northern Rhodesian Copperbelt: is it a classic example of syngenetic deposition, 375–390
Gilmour, P., discussion by, 618
Hydrothermal versus syngenetic theories of ore deposition (discussion), 145
Gneiss, biotite-garnet, 82
feldspathic, 81
Gokhale, K. V. G. K., article by discussed, 291
Gold, D. P., *Average chemical composition of carbonatites* (communication), 988
Gold Hill district, biotite, 1134
Goldich, L. S., and Bergquist, H. R., on aluminous lateritic soils, 518
on Jamaican bauxite, 286
Gold-quartz deposits, Yellowknife, N.W.T., the origin of the (discussion), 804–811
Gold and silver in Witwatersrand ores, distribution of, 964
Goldich, S. S., on bauxite, 1301
Goldschmidt, V. M., on ionic potentials, 1273
on silver with gold, 964
on zinc in oxidic iron, 974
Goldstein, E. H., on uranium genesis in the Front Range, 848
Gordon, M., Jr., on bauxite in Arkansas, 1306
Gorsky, I. I., book edited by reviewed, 1168
Goss, W. D., Rader and Coats, *Distribution of fluorine in unaltered silicic volcanic rocks of the Western conterminous United States,* 941–951
Granite, 82, 89, 587
Graph, shale distillate boiling point related to time, 214
time-temperature relationship in shale distillation, 213
Graphs, critical point curves NaCl solution, 198
Graton, L. C., on vapor phase, 1079
Grawe, O. R., abstract by, 162
Gray, A., on sulfide ores in sedimentary rocks, 324
Grayson, C. J., Jr., on decisions to drill, 480
Great Lakes, 781
Green, J., on radius values, 565
Green, R., discussion of discussion of paper by, 1162–1163
Green, W. D., and Damon, P. E., *Age of Cornwall, Pennsylvania magnetite ore* (discussion), 143–145
Greisenization in Langkawi, Northwest Malaya, tourmaline (Hutchison and Leow), 587–592
Grigorev, I. F., and Dolomanova, E. I., on cassiterites, 533
Gritsaenko, G. S., Sludskaya, N. N., and Aidinyun, N. Kh., on bravoite and millerite, 857
Griqualand, 776
Groen, H. A., on Rhodesian Copperbelt, 381
Grogan, R. M., and Temple, *Manto deposits of fluorspar, Northern Coahuila, Mexico,* 1037–1053
Gross, W. H., on uranium as an index of mineralization, 506
Ground water in the coastal region of Midnapur, West Bengal, India; occurrence and geochemistry of (Singhal), 419–433
Ground water types, West Bengal coast, India, 429
Grout, F. F., Wolff, and Thiel, on high manganese associated with carbonate iron formation, 523
Grubb, P. L. C., *Critical factors in the genesis, extent, and grade of some residual bauxite deposits,* 1267–1277
Guide to ore deposits, thermal glow tests as a (communication), 800–803
Guilinger, R. R., *Source of uranium in the Gas Hills area, Wyoming* (communication), 285–289
Gruner, J. W., on hydro goethite, 291
on Mesabi ores, 235
on multiple accretion of uranium ores, 845
Grushkin, G. G., and Prikhid'ko, P. L., on fluid inclusions, 199
Grutt, E. W., Jr., on uranium deposits related to natural gas, 843–844
Gübelin, E. J., on inclusions in emeralds, 203
Guiana Shield, Venezuela, map geology (northern part), 71

Gushkin, G. G., and Prikhid'ko, P. L., on water of fluid inclusions, 889
Gustafson, L. B., on fugacity of sulfur, 489
Phase equilibria in the system Cu-Fe-As-S, 667–701

Hagner, A. F., and Collins, L. G., on iron ore origin, 233
Hagner, A. F., Collins, and Clemency, *Host rock as a source of magnetite ore, Scott Mine, Sterling Lake, N. Y.*, 730–768
Hagni, R. D., abstract by, 162
Hakhimzhan, O. E., book by reviewed, 1167
Halite, inclusions in, 182
Hall, Wayne E., and Friedman, *Composition of fluid inclusions, Cave-In-Rock fluorite district, Illinois, and upper Mississippi valley zinc-lead district*, 886–911
Roedder, E., Ingram B., and Hall, W. E., *Studies of fluid inclusions III: extraction and quantitative analysis of inclusions*, 353–374
Halos, 649, 653, 660
chemical composition, 657
geological occurrence of, 653
texture and structure of, 653
origin of, 664
time of development of, 663
"Halo" versus "Aureole" (communication), 601–603
Hamblin, W. K., and Salotte, C. A., abstract by, 1189–1190
Hardin, G., and Bateson, *A geochemical approach to the problem of bauxite genesis in British Guiana*, 1301–1308
Harder, E. C., on British Guiana bauxites, 1307
on relationship of kaolin to bauxite, 1301
Hargraves, R. B., *Silver-gold ratios in some Witwatersrand conglomerates*, 952–970
Harker, A., on manganese ores, 439
Harley, G. T., on Hillsboro mining district, 1278
Harrison, A. G., and Thode, H. G., on fractionation of sulfur isotopes, 324
Harrison, J. B., on alteration of feldspar to gibbsite, 1301
Harrison, J. M., report on research in economic geology in Canada, 622
Hartley gold district, 779
Haughton, S. H., review of book by, 1016
Hausmannite, 437
Hautermans and Stauffer, on thermoluminescence, glow curves, 800–803
Hawkes, H. E., book by reviewed, 469
dithizone field tests, 579–586
Hawley, J. E., and Nichol, I., on Co and Ni in pyrite, 551
Hawley, J. E., review of book by, 155
Haworth, E., on origin Miss. Valley deposits, 887
Haynes, V., on two minerals in contact, 1342
Heavy metal extractant, 580
Heavy mineral reconnaissance, Florida West Coast (Bates), 1237–1245
Hedberg, H. D., on expulsion of fluid, 1147
Hematite, 125, 550
Hemley, J. J., article discussed by, 808–811
on bisulfide complex, 1077
Henglein, on kobaltnickelpyrite, 855
Herath, J. W., *Kaolin in Ceylon*, 769–773
Hewett, D. F., Fleischer, M., and Conklin, N., *Deposits of the Manganese Oxides: Supplement*, 1–51
Hewett, F., on bravoite, 854
Heyding, R. D., and Despault, G. J. G., on algodonite, 487
Heyl, A. V., Jr., and others, against ore from meteoric water, 1148
on zinc and lead of the Mississippi Valley, 1153
Hidden, W. E., on quartz with emerald, 186
High Africa, Precambrian orogenic metallogenetic belt, 776
Hill and Green, article by, discussed, 291
Hillebrand, J. R., on quartz from the Idarado mine, 177
Hillebrand, W. F., on bravoite, 854
Hirst, D. M., and Dunham, *Chemistry and petrography of the Marl Slate of S.E. Durham, England*, 912–940
History of core orientation, 1314
Holden, E. F., on fluid inclusions, 191
Holland, T. H., on charnocknite, 572
Hollandite, 438
Holbrook, D. F., abstract by, 162
Hornblende, 1293
Hose, H. R., *Jamaica type bauxites developed on limestones*, 62–69
on bauxite, 1301
on origin for the Jamaica bauxite, 816–817
Host rock as a source of magnetite ore, Scott Mine, Sterling Lake, N. Y., (Hagner, Colins, and Clemency), 730–768
Hostetler, P. B., article discussed by, 808–811
Hot spring apron oxides of manganese, 23
Hotz, P. F., on magnetite deposits, Sterling Lake, N. Y., 736
Howard, P. F., on permeability of amphibolite, 757
Howell, F. H., and Molloy, J. S., on Braden orebody, Chile, 451
Huang, C. K., and Kerr, P. F., on simple and complex carbonates, 564
Huber, N. K., James, and White, on Lake Superior iron formations, 516
Hulin, C. D., on mineralizing solutions, 1076
Hunt, C. B., on evaporite zonation, 322
Hunt, J. M., on infrared spectra of rock forming minerals, 564

Hutchison, C. S., and Leow, *Tourmaline greisenization in Langkawi, Northwest Malaya*, 587–592
Hutchinson, G. E., on bacterial reduction of sulfate, 722
Hutchinson, R. W., articles by discussed, 998, 1159–1166
Hydrogen sulfide precipitating uranium ores, 842
Hydrothermal alteration, 1116
facies and types of (discussion), 808–811
Hydrothermal developments in the Andes (Kents), 1110–1118
Hydrothermal developments, late magmatic stage, 1113
reorganizing stage, 1112
replacement stage, 1112
transformation stage, 1111
Hydrothermal dikes, 588
Hydrothermal dissolution and redeposition by remobilization, 1074
Hydrothermal ore formation, thermodynamic models of, 688–699
Hydrothermal solution acids transport as complex ions, 1077
as free ions, 1077
Hydrothermal solution alkalines, transport as complex ions, 1078
transport as free ions, 1078
transport in colloidal state, 1078
Hydrothermal transport, 1078
Hypogene ores, 1119

Ibapah stock, biotites, 1135
Idaho, manganese, 25, 34
silver mineralization in the Mineral district, Washington County (Anderson), 1195–1217
Identification of phases, equilibrium studies, 860
Igneous genesis of pegmatites, 102
Igneous rocks, northern Coahuila, 1041
Ikornikova, N. Yu., on calcite solubility, 175
Ilvaite, 335
Inclusion, filling temperatures, 197
II: freezing data and their interpretation, studies of fluid (Roedder), 167–211
ground water leakage, 207
in halite, 182
in pegmatitic fluorite, 180
nature of, 894
types, 199
with a single phase, 196
India, distribution of radioactivity in the Mosaboni copper mine, Bihar, (Gangadharam, Kameswara and Aswathanarayana), 506–514
microscopic examination of manganese ores of Srikakulam and Visakhaputnam (Vizagapatam) districts, Andhra Pradesh (Krishna Rao), 434–440
Occurrence and geochemistry of ground water in the coastal region of Midnapur, West Bengal (Singhal), 419–433
India—Continued
the manganese ores of Kutingi Mines, Koraput district, Orissa (Sriramadus, A.), 569–578
Inertinite, 1101
Influence zone of a sample, 1250
Infrared absorption and reflection for various rocks, 277
absorption and reflection with α quartz, 275
emission from rocks, 282
radiation, analysis of rock and minerals by reflected (Lyon and Burns), 274–284
spectra of maceral concentrates, 349
spectroscopy to mineral analysis, some basic considerations in the application of (Adler), 558–568
Ingerson, E., and Morey, G. W., on primary magmatic solution, 1079
Ingerson, E., on secondary magmatic solution, 1074
Ingram, B., Hall, W. E., and Roedder, E., *Studies of fluid inclusions III: extraction and quantitative analysis of inclusions in the milligram range*, 353–374
Insoluble residues, tropical residues, 139
Instrumental design, 1055
Ionic potentials and bonding, 1273
Iowa shales, destructive distillation of carbonaceous (Arnold and LaRose), 212–217
Iron and manganese in sedimentary iron formations, relation of (Lepp), 515–526
deposits associated with diabases, origin of certain, 341
deposits of the Guiana shield, Venezuela, geology and petrology (Stam), 70–82
deposits, Venezuela, 78
formations, Venezuela, 223
mobilization, assessment of, 338
native, 490
ores, Cerro Bolivar, Venezuela, 227
ores, Cerro Bolivar, Venezuela, the (Ruckmick), 218–236
Removal during alteration of basic rocks, 339
Springs district, biotite, 1132
Isaenko, M. P., book by reviewed, 461
Isodesmic compounds, 562
Isotope distribution, sulfur, 660
Isotopic fractionation, 842
Isotopic variations in ore deposits, 324
Ituri mineralogenetic province of Africa, 782

Jacobsite, 437
Jamaica bauxite, origin, 66
Jamaica type bauxites developed on limestones (Hose, H. R.), 62–69
James, H. R., White, and Huber on Lake Superior iron formations, 516

Jensen, M. L., and Field, C. W., on sulfides associated with the uranium minerals, 842
Jensen, M. L., on biogenic origin for sulfur, 325
on H_2S as a reductant for uranium ions, 84
on S_{32}/S_{34} ratios, 660
on sulfur isotope ratios, 325
Jigging, 576
Jillson, W. R., on variation in sulfur in coal, 721
John, T. U., *Geology and mineral deposits of east central Balabac Island, Palawan Province, Philippines*, 107–130
John, Y. W., *Geology and origin of Sangdong tungsten mine, Republic of Korea*, 1285–1300
Johnson, N. M., on bleached thermoluminescence, 1225
Jointing and manganese ore, 573
Joints, faults, fissures, and fractures (communication), 1157–1158
Jonas, E. C., on hydrated montmorillonite, 1346
Jones, J. M., and Bell, *A new technique for the laboratory coring of coal*, 791–795
Jones, J. M., and Murchison, D. G., *The occurrence of resinite in bituminous coals*, 263–273
Joralemon, I. B., discussion by, 1345
Joralemon, P., on pyrite-orpiment, 492
Jordaan, J., on Nkana gabbro, 453
on Rhodesian Copperbelt, 381

Kalgoorlie, Western Australia, data on cuprian coloradoite from (Radtke), 593–598
Kalima-Moga, 781
Kalita, A. P., book by reviewed, 147
Kaolin, autochthonous, residual, 1003
in Ceylon (Herath), 769–773
clay reference locality, Mesa Alta, New Mexico, geology of A.P.I. Project 49 (Reeves), 237–249
Karamyan, K. A., book by reviewed, 148
Karroo, 777
Kusai-Angola, diamonds, 782
Katangian geosyncline, mineralogenic belt, 779
Katsura, T., and Kushiro, I., on occurrence of titanomaghemite, 343
Kazakov, G., on Lowmoor sulfur content, 722
Keith, M. L., and Degens, E. T., on sulfur content of shales, 722
Keith, M. L., and Williams, *Relationship between sulfur in coals and the occurrence of marine roof beds*, 720–729
Kendall, D. L., on E. Tennessee ores, 174
on origin Mississippi Valley type deposits, 888
Kents, Paul, *Hydrothermal developments in the Andes*, 1110–1118
Kermesite, 1309
Kerr, P. F., Kulp, J. L., and Hamilton, P. K., on New Mexico kaolinite, 244
Kerr, P. F., et al., on Temple Mountain uranium, 848
Kerr, P. F., on bravoite, 855
on vaesite, (NiS_2), 856
Khabakov, A. V., book edited by reviewed, 1167
Kifurwe, 782
Kilembe, 782
Kilo-Moto gold districts, 783
Kinetics of a replacement reaction (Ames), 1229–1236
Kinkel, A. R., Jr., article by discussed, 997–1008
discussion by, 1159–1160
Kilburn, L. C., on Cu, Ni & Zn in ores and igneous rocks, 975
Kimberley Reef, 957
Kipushi, 780
Kirchheimer, F., book by reviewed, 1354
Kisenge, 781
Klerkdorp area, silver percentage, 958
Klevtsov, P. V., and Lemmlein, G. G. on fluid inclusions, 198
Koch, G. S., Jr., and Link, *Distribution of metals in the Don Tomas Vein, Frisco Mine, Chihuahua, Mexico*, 1061–1070
Kolwezi, 780
Königsberger, Joh., and Müller, W. J., on fluid inclusions, 196
Konstantinov, M. M., book by reviewed, 1353
Korea, geology and origin of Sangdong Tungsten Mine, Republic of (John), 1285–1300
Korzhinski, D. L., on ascending solutions, 1076
on open systems, 1163
Kosanke, R. M., and Harrison, J. A., on resinite in coal, 264
Kraume, E., and Oftedahl, C., on Rammelsberg, 327
Krauskopf, K. B., Marchandise and Garrels on stability fields of sedimentary manganese minerals, 515
on mineralizing solutions, 1076
on vapor transport, 1081
Kriging, 1259
Krishna Rao, J. S. R., *Microscopic examination of manganese ores of Stikakulanlam and Visakhapatnam (Vizagapatam) Districts, Andhra Pradesh, India*, 434–440
Kudenko, A. A., article discussed by, 815–816
Kuenen, P. H., on clastics in deep water, 111
Kuhlwein, F. L., on resinite migration, 270
Kullerud, G., and Clark, L. A., abstract by, 1188–1189
Kullerud, G., and Yoder, H. S., on Fe-S system, 856

Kullerud, G., and Yund, R. A., on Ni-S system, 856
Kullerud, G., *The sulfur-rich portion of the Fe-Ni-S system*, 853–885
Kulp, J. L., with Fanale, F. P., discussion of article by, 143
Kun, N. de, *The mineralogenetic provinces of Africa*, 774–790
Kupferschiefer, 913
Kuznetzov, S. S., et al., book by reviewed, 460
Kwarri hoek mine, Transvaal, 543

Laboratory investigation of copper minerals, 491
Lacy, W. C., on enargite-realgar-orpiment, 489
Lake Nyasa mineralogenetic belts of Africa, 783
Lake Togo, 790
Lake Victoria mineralogenetic belt of Africa, 783
Lamar, J. E., and Shrode, R. S., on limestone and dolomite fluid inclusions, 889
Lamprophyre, 82
La Rose, J. A., Jr., and Arnold, L. K., *Destructive distillation of carbonaceous Iowa shales*, 212–217
Larsen, E. S., Jr., on fluorine in late-stage alkalic differentiates, 943
Las Animas mining district, 1278
Last Chance stock, biotite, 1130
Late magmatic stage, 1113
Lateral secretion, 804
Laterites, 770
Launer, P. J., silicate absorption spectra, 564
Lautite, arsenic, 489
-arsenopyrite, 496
-tennantite, 489
Lawn, J. G., on low silver associated with high gold, 954
Lea, F. M., on burnt bauxite pozzolan, 708
Lebour, G. A., on Marl Slate, 913
Lead in biotites, 1141
minerals in Pakistan, occurrence of, 607
-molybdenum system, 1121
and zinc in biotites from *Basin and Range quartz monzonites, copper* (Parry and Nackowski), 1126–1144
-zinc deposit, the Reocim deposits, Santander, Spain and their bearing on the Mississippi-Alpine (discussion), Brotzen, 294
Lee-Potter, J. B., on Rhodesian Copperbelt, 381
Leet, R. D., and Judson, S., on geology as a science, 477
Leeuwpoort Mines, Transvaal, 546
Lemmlein, G. G., on fluids in inclusions, 197
on form of inclusions, 895
Leopold, L. B., on New Mexico kaolinite, 245
Leney, G. W., *A new nomogram for the solution of problems in structural and economic geology*, 1326–1339
Leow, J. H., and Hutchison, C. S., *Tourmaline greisenization in Langkawi, Northwest Malaya*, 587–592
Lepp, H., and Goldich, S. S., on precambrian iron formations, 516
Lepp, H., *The relation of iron and manganese in sedimentary iron formations*, 515–526
Le Riche, H. H., on Lower Lias of S.W. England, 929
Leube, A., and Stumpfl, E. F., *The Rooiberg and Leeuwpoort tin mines, Transvaal, South Africa*, 391–418 and 527–557
Levinson-Lessing, F. Yu., book by reviewed, 1352
L'Évolution de la lithosphere, Vol. IV. glyptogenèse (Termier), 156
Liebenberg, C. J., Ni-contents of granites, 542
Liebenberg, W. R., gold inclusions in pyrite, 964
Limestone, France, boehmitic bauxite on, 67
Jamaica, gibbsitic bauxite on karsted Lower Miocene, 66
Lindgren, W., on "gaping fissure," 1158
on tuffs of Oroville, 716
distribution of fluorspar deposits, 942
on colloform structures, 1214
on deposition of sulfides, 1078
on greisen and tourmaline rock, 590
on syngenetic deposits, 316
Link, R. F., and Koch, Jr., *Distribution of metals in the Don Tomas Vein, Frisco Mine, Chihuahua, Mexico*, 1061–1070
Linnaeite, 552
Lippincott, E. R., et al., on effects of coordination change on absorption, 565
Listova, L. P., book by reviewed, 148
Lithogene deposits, characteristics of, 329
Lithogene, epigenetic, diplogenetic and syngenetic deposits (Lovering), 315–331
Lithological control, host rock and wall rock manganese deposits, 573
Little Cottonwood stock, biotite, 1132
Little, W. M., on tin deposits, 291
Ljunggren, P., article by discussed, 456
discussion by, 1350
Loellingite, 490
Loellingite associations, 495
Lombard, J., book coedited by reviewed, 632
Love, J. D., on uranium in Wyoming, 285
Love, L. G., article by discussed, 998
on Kupferschiefer, 328
on spherical pyrite in Marl Slate, 916
Love, L. G., and Zimmerman, D. O., on biogenic origin of pyrite, 325
Lovering, T. S., *Epigenetic, diplogenetic, syngenetic and lithogene deposits*, 315–331

The low temperature synthesis in aqueous solution of chalcopyrite and bornite (Roberts), 52–61
Lowdon, J. A., discussion by, 807
Lower Congo geosyncline mineralogenic belt, 788
Luanda, 789
Lundegårdh, P. H., on Zn in igneous rocks, 974
Lundqvist, D., on synthesis of bravoite, 857
on violarite, 857
Luzonite, 488
-chalcocite, 489
-covellite, 489
-tennantite, 489
Lyon, R. J. P., and Burns, E. A., *analysis of rocks and minerals by reflected infrared radiation*, 274–284
Lyons, W. A., *Structural geology of Pulacayo Mine, Bolivia*, 978–987

MacDougall, J. F., on volatile transfer of copper, 1083
Macerals, 263, 347
Mackenzie, R. C., Meldan, R., and Gard, J. A., on pH for bauxitization, 1269
Madagascar mineralogenetic belts of Africa, 783
Magma, engulfment of old veins by invading, 1073
Magmatic fluids, 1114
Magmatic hydrothermal and fracture-controlled uranium ores, 847–849
Magmatic solutions, primary, 1075–1076
secondary, 1074–1075
Magmatic sphalerite in Missouri basic rocks (Desborough), 971–977
Magnetic disturbance, sun chart compass corrections for reconnaissance mapping and geophysical prospecting in areas of (Fraser), 131–137
Magnetic separation, 577
Magnetite, 549, 734
Scott Mine, Sterling Lake, N. Y., host rock as a source of (Hagner, Collins, and Clemency), 730–768
Magnetite-ulvöspinel in basic rocks in Missouri, mobilization of iron by alteration of (Desborough), 332–346
Maine, the Peg claims spodumene pegmatites (Sundelius), 84–106
Main Reef leader, 957
Major element composition, Marl Slate, 921
Malachite, 126
Malakhov, A., book by, reviewed, 1354
Malan, R. C., and Ranspot, H. W., on hydrothermal type deposit of uranium, 847
Malaya, bauxite in, 1267
tourmaline griesenization in Langkawi, Northwest (Hutchison and Leow), 587–592
Malinin, S. D., on fluid inclusions, 191
Malyuga, D. P., book by reviewed, 1352
Malyuga, D. T., on euxinic sediments of the Black Sea, 321
Manganese, deep-sea nodules, 37
distribution of the chemical elements with, 39–47
hot spring deposits, 23
minerals, 573
ore and depth, 573
ore deposits, 572
ores of Kutingi Mines, Koraput district, Orissa, India, The (Sriramadas), 569–578
ores of Srikakulam and Visakhapatnam (Vizagapatam) districts, Andhra Pradesh, India, microscopic examination of (Krishna Rao), 434–440
oxides, Deposits of the (Hewett, Fleischer and Conklin), 1–51
in sedimentary iron formations, relation of iron and (Lepp), 515–526
stratified oxides, 33
Manheim, F. T., on sediments from the Baltic Sea, 320–321
Manonokitotolo, 781
Manto deposits of fluorspar, Northern Coahuila, Mexico (Temple and Grogan), 1037–1053
Map, Atlantic rim mineralogenetic province, 784
bauxite belt, Guiana coastal plain, 251
bauxitized areas, Jamaica, 64
Bolivia, Pulacayo located, 979
Boralasgamuwa kaolin deposit, Ceylon, 770
centers of mineralization, Leeuwpoort, Transvaal, 402
Cerro Bolivar location in Venezuela, 219
of coast of Langkawi, Malaya, 588
Colorado Plateau, uranium areas, 1151
composite, levels, and corresponding long section, Pulacayo, 985
East Rand Basin, percent silver in bullion heads, 956
eastern Africa, mineralogenetic province, 784
Florida, offshore petroleum lease, 1238
flow directions in ore deposits, 414
fluorine content of Cenozoic silicic volcanic rocks, 942
geological, Kutingi area, Koraput district, Orissa, India, 571
geological sketch, N.E. England, 913
geological, tin mines, Transvaal, 392
geological, tin ore deposit details, Transvaal, 399, 401, 416
geologic and sections, Peg claims, Maine, 87
geologic, Northern Rhodesian copper belt, 386
geologic, part of Balabac Island, Philippines, 117, 121
geologic, Roan-Muliashi basin, 387, 615
geologic, Rockland area, Maine, 86
geology, Cerro Bolivar area, Venezuela, 74

Map—Continued
geology, Cerro Bolivar, 222
geology, India, 507
geology, of Guiana Shield, Venezuela, 71
Hillsboro mining district, 1279
location, Kutingi manganese mines, India, 570
index, Mesa Alta kaolin deposit, New Mexico, 238
index, mineral district, Idaho, 1197
index, Peg claims, Maine, 85
index, Utah, Nevada, biotite samples, 1136
index, White Pine copper mine, 644
Klerksdorp district, workings and Vaal Reef structure, 959
Lisbon Valley belt, 1152
mineralogenetic provinces, 777
Northern Rhodesia—Katanga—Angola base metal belt, 380
mine, glow-test aureoles on each side of the vein, 802
radiometric, outcrop of manganese ore, 995
relation of major ore to major structural basins, 1154
Rhodesian copperbelt, copper lineament, 378
Rhodesian copperbelt Lufilian arc, 379
Rhodesian copperbelt, ore deposits related to paleo shoreline, 377
Sangdong mine, 1289
and section, mines, Guiana bauxite belt, 252, 254
sketch, lithological and structural control in Kutingi manganese mines, 574
Scott group, Sterling Lake, New York, 735
Southcentral Maine, 85
structural and locality, Balabac Island, Philippines, 115
structural, Rooiberg, Transvaal, 396
sulfur content of some Pennsylvania coals, 723, 724
tectonic of China, Russian, reviewed, 631
topographic, A.P.I. Project 49 kaolin locality, 239
water well locations, Midnapur, India, 421
of the White Pine area, structure contour, 647
White Pine mine, mineralized fracture, 648
Mapping and geophysical prospecting in areas of magnetic disturbance, sun chart compass corrections for reconnaissance (Fraser), 131–137
Marcasite, 1202
Marchandise, H., on sedimentary iron, 516
Garrels and Krauskopf, on stability fields of sedimentary manganese minerals, 515
Markham, N. L., discussion of paper by, 1166
Marl Slate of S.E. Durham, England, chemistry and petrography of the (Hirst and Dunham), 912–940
Marmo, V., on sulfide and graphite mobilized in vein, 323
Mason, B., on chorides of metals, 1080
on vredenburgite, 438
Mathematical derivation of equation, 1322
Mather, K., on pozzolans, 705
Matheron, G., *Principles of geostatistics*, 1246–1266
MacNulty, W. N., and Levinson, A. A., abstract by, 1187
McCulloch, D. S., on fluid inclusions, 184, 895
McDougall, D. J., on thermoluminescence, 800–803
McKinnon, D. M., and Smit, N. J., on Rhodesian copperbelt, 379
McKinstry, H. E., on fractures, 1157
on horsetail structure, 987
on maps as a record of geological facts, 478
Mineral assemblages in sulfide ores. The system Cu-Fe-As-S, 483–505
on system Cu-Fe-As-S, 670
on a vapor phase transport, 1079
Mead, W. J., on drill core orientation, 1314
on relationship of kaolin to bauxite, 1301
on the two drillhole problem, 618–621
Mechanisms of mineral zoning, 815
Mechanisms of ore remobilization by encroaching magma, 1073
Mediterranean area, chemical analyses of bauxites, terra rossas and limestones, 68
Mekambo, 788
Mendelsohn, F., paper by discussed, 614
on Rhodesian copperbelt, 375
Merriam, R., on tuffs in California as pozzolans, 715
Mertie, J. B., Jr., on temperature of quartz crystallization, 186
on the two drillhole problem, 618–621
Mesabi ore compared with Cerro Bolivar, 235
Mesodesmic compounds, 561
Messina, 779
Metal with dithizone, estimation of, 583
Metal dithizone, formation of, 582
Metamorphic differentiation, and pegmatite genesis, 101
Metamorphic host rocks, other ore deposits derived from, 761
Metasomatism, 589
evidence of, 733
Meteoric hypothesis Miss. Valley deposits, 887
Methods of investigation, phase relations in the Fe-Ni-S system, 858
replacement experiments, 1229
Mexico, distribution of metals in the Don Tomas Vein, Frisco Mine, Chihuahua, (Koch, Jr. and Link), 1061–1070

Mexico—Continued
manganese, 23
manto deposits of fluorspar, Northern Coahuila (Temple and Grogan), 1037–1053
Michell, W. D., with Moses, J. H., *Bauxite deposits of British Guiana and Surinam in relation to underlying unconsolidated sediments suggesting two-step origin*, 250–262
Michigan, some vein, wall rock relationships in the White Pine Mine, Ontonagon Co. (Carpenter), 643–666
Micrinite, 1101
Microanalysis of fluid inclusions, 361
Microscopic examination of manganese ores of Srikakulam and Visakhapatnam (Vizagapatam) districts, Andhra Pradesh, India (Krishna Rao), 434–440
Mielenz, R. C., on pozzolans, 703
Miers, H. A., on fluid inclusions, 200
Milkey, R. G., silicate absorption spectra, 564
Miller, F. A., and Wilkins, C. H., on infrared absorption, 563
Miller, W. J., on magnetite formed by alteration of hornblende, 761
Mills, J. W., discussion by, 621
on two drillhole problem, 619–621
Mine description, Mosaboni copper mine, Bihar, India, 508
Mineral assemblages in sulfide ores: The system Cu-Fe-As-S (*McKinstry*), 483–505
Mineral composition, calculated from analyses, 922
Marl Slate, 922
by X-ray diffractometry, 922
Mineral deposits, chemical kinetics and the formation of (communications), 604–605
and geology of, east central Balabac Island, Palawan Province, Philippines (John), 107–130
Mineral distribution, tin orebodies Transvaal, 413
Mineral matter, coal seam, 1102
in shaly coal, 1105
in vitrinite, 1097
Mineral Range stock, biotite, 1134
Minerals in the sulfur-rich portion of the Fe-Ni-S system, 854–855
Mineralization, 1116
fluorspar, manto type, northern Coahuila, 1043
temperature of, 1213
in the White Pine Mine, fracture controlled, 649
Mineralogenetic provinces of Africa, The (de Kun), 774–790
Mineralogical and textural features, 653
Mineralogy, Jamaica bauxites, 63
Lorraine ore body, Balabac Island, 125
Mineral district, Idaho, 1199
Mineralogy—*Continued*
New Mexico kaolinite, 245
Rooiberg and Leeuwpoort tin mines, Transvaal, South Africa, 527–557
Sangdong tungsten mine, Korea, 1291
spodumene pegmatite, 96
Minim Matrap, 789
Mining districts as phase systems, 502
Mining exploration, search for optimum in, 1265
Minnesota, mineralization in Cook County (communication), 796–803
Minor element composition, Marl Slate, 925
Mississippi Valley-type Deposits, fluid inclusions, 169
type lead and zinc deposits, 1153
zinc lead district, Composition of fluid inclusions, Cave-In-Rock fluorite district, Illinois, and upper (Hall and Friedman), 886–911
Missouri basic rocks, magmatic sphalerite in (Desborough), 971–977
mobilization of iron by alteration of magnetite-ulvöspinel in basic rocks in (Desborough), 332–346
Pea Ridge, Iron Mtn. and Bourbon, 340
Pilot Knob, 340
Shepherd Mtn. Vein, 340
Mitcham, T. W., *Fractures joints, faults, and fissures* (communications), 1157–1158
Mn and Fe, separation during transport, 519
Mn/Fe ratios in iron ores, 521
in sedimentary rocks, 517
Moanda, mineralogenic belt, 789
Mobilization of iron by alteration of magnetite-ulvöspinel in basic rocks in Missouri (Desborough), 332–346
Mocambiquian mineralogenetic belt of Africa, 783
Modal analyses, magnetite, 741
Mode of incorporation of minor elements in Marl Slate, 937
Mode, spodumene pegmatite, 96
Molybdenite, 1292, 1342
Molybdenum in the Marl Slate, 929
Montana, manganese ore, 8
Monzonites, copper, lead and zinc in biotites from Basin and Range, Quartz (Parry and Nackowski), 1126–1144
Moorehead, G. A., on size of Jamaica bauxite deposits, 817
Moorehouse, W. W., on titaniferous magnetite of deuteric origin, 342
Moran, W. J., and Gilliland, J. L., on specifications of pozzolan, 706
Morey, G. W., and Niggli, P., on water is hydrothermal as defined, 888
Morey, G. W., on solids in gases, 1079
Moritz, H., on luzonite-enargite, 488
Moses, J. H., and Mitchell, W. D., on bauxite of British Guiana and Surinam, 1307

Moses, J. H.—*Continued*
Bauxite deposits of British Guiana and Surinam in relation to underlying unconsolidated sediments suggesting two-step origin, 250–262
on bauxites, formed in situ, 1301
paper by discussed, 1002–1007, 1160–1161
reply to discussion of article by, 1007
Mounana, 789
Movement of material, 756
Mukherjee, B., discussion by, 1348
Murchison, 778
Murchison, D. G., and Jones, J. M., *The occurrence of resinite in bituminous coals*, 263–273
Murphy, J. E., and Mejia, V. V., on iron, 341
Muscovite, alkali content, 98
Musoma, 784
Mufulira, 780
Mutuntu, 780
Mwadui, 785

Nackowski, M. P., and Parry, W., *Copper, lead and zinc in biotites from basin and range quartz monzonites*, 1126–1144
Nalivkin, D. V., book by reviewed, 1352
Namaqualand, mineralogenic belt, 787
Nandy, N. C., and Subramanian, R. S., book by reviewed, 1174
Natarajan, R., and Garrels, R. M., on system Cu-Fe-S-O, 670
Neumann, H., on sphalerite in igneous rocks, 974
Nevada, Ely district, 1131
manganese ore, 9, 17, 25, 27, 35, 37
Whitehorse Pass stock, 1132
Nevin, C. M., on fractures, 1157
on joints, 1157
New Mexico, geology of A.P.I. Project 49 kaolin clay reference locality, Mesa Alta (Reeves), 237–249
Hillsboro mining district, economic geology of a part of the (Reeves), 1278–1284
manganese ore, 9, 17, 18
A new technique for the laboratory coring of coal (Jones and Bell), 791–795
Newhouse, W. H., on fluid inclusions, 169, 177, 888
on iron deposits and diabases, 339
on primary magmatic solutions, 1076
on sphalerite in igneous rocks, 973–974
Newhouse, W. H., Hagner, A. F., and De Vore, G. W., on migration of elements into openings, 754
on structural preparation, 753
Ngaoundal, 789
Ngwenya, 778
Nicholls, G. D., on magnetite altered to martite, 344
Nickel, pockets, A-6 mine, Transvaal, 541
Nicolini, P., book coedited by, reviewed, 632
Nigeria, mineralogenetic province in Africa, 789
Nininger, R. D., et al., on precipitation of uranium, 848
Nishihara, H., on stratiform copper deposits, 448
Noble, E. A., *Formation of ore deposits by water of compaction*, 1145–1156
Nolan, T. B., on statistical distribution of mineral deposits, 480
Noll, W., on zoning, 532
Nomogram, general purpose, 1327
for the solution of problems in structural and economic geology, A new (Leney), 1326–1339
Norite, 82
North Carolina, The Ore Knob massive sulfide copper deposit (discussion), 1159–1166
The Northern Rhodesian copperbelt: Is it a classic example of syngenetic deposition (Gillson), 375–390
Northern Rhodesia, hydrothermal versus syngenetic theories: post-Katanga batholiths in (Discussion), 292
Nugget effect, 1249, 1262

Occurrence and geochemistry of ground water in the coastal region of Midnapur, West Bengal, India (Singhal), 419–433
Occurrence, kaolin, New Mexico, 244
and origin, coloradoite, 593
of resinite in bituminous coals (Jones and Murchison), 263–273
Odger's method of core orientation, 1315
Oelsner's, O., on chalcopyrite in tennantite, 494
Offield, T. W., on metasomatic gneiss in New Jersey, 731
Oftedahl, C., and Kraume, E., on Rammelsberg, 327
Ohle, E. L., on ground water, 1149
on Mississippi Valley-type deposits, 169, 1153
Ohle, W., on hydrogen sulfide production, 722
Okamoto, G., Okura, T., and Goto, K., on colloidal, silica, precipitated, 1269
Olifants, 778
Olivine altered to chlorite, 335
O'okiep, 787
Oosterbosch, R., on Rhodesian copperbelt, 389
Open system model, 690
Optical properties, bravoite, violarite, 860
cuprian coloradoite, 597
Orange Free State, silver content of gold, 960
Orange River, 787
Ore bodies, Rooiberg tin mines, Transvaal, 531
Ore, character of the, 1280
Ore deposition, controlling structural factors for, 413

Ore deposits believed formed by water, examples of, 1150
Ore deposits, Cave-In-Rock fluorite district, and Upper Mississippi Valley, 890
derived from metamorphic host rocks, 761
formed by water of compaction, characteristics expected of, 1150
Sangdong tungsten mine, Korea, 1288
by water of compaction (Noble), 1145–1156
Ore dressing problems, 127
Ore formation, thermodynamic models of hydrothermal, 688–699
Ore, megascopic features of the, 1199
occurrence and distribution of the, 1198
Solution chemistry, I experimental determination of mineral solubilities (Barnes), 1054–1060
Oregon, manganese, 18
Organic fluids in inclusions, 201
Orientation problems solved with a nomogram, 1326
of small diameter drill core (Zimmer), 1313–1325
Origin of certain iron deposits associated with diabases, 341
of Guiana bauxite, 261
of Guiana bauxite, features bearing upon, 252
kaolinite, New Mexico, 243
of manganese deposits, 576
of the Mississippi Valley-type deposits, 887
of the ores, Cerro Bolivar, Venezuela, 233
Sangdong tungsten mine, Korea, 1298
Orpiment, 487
bacterial action on (communication), 991–994
Otavi, mineralogenic belt, 787
Otvos, E. G., book reviewed by, 155
Oxidation of metallic copper, 665
of sulfide ores in the Mildren and Steppe Mining Districts, Pima County, Arizona (Williams), 1119–1125
of the ores, 1120

Page, L. R., book edited by reviewed, 156
Pakistan, lead mineralization in the Abbottabad area, Hazara District, West (communications), 605–608
Palawan and North Borneo, geology, compared, 113
Paragenesis, 575
determination of, 1343
Indian manganese ores, 439
at the Lacorne Mine, Quebec (communication), 1340–1344
Leeuwpoort lodes, 548
Mineral district, Idaho, 1211
of ore, B-mine, Transvaal, 542
Sangdong tungsten mine, Korea, 1297
Paragenetic sequence of alteration in basic rocks, 341
sequence of copper minerals, 661
textural criteria, 1343
Pareek, H. S., *Petrology of Talcher Coals*, 1089–1108
Park, C. F., on zonal theory of ore deposits, 450
Parry, W. T., and Nackowski, M. P., *Copper, lead and zinc in biotites from basin and range quartz monzonites*, 1126–1144
Pasquali, J. Z., and Bisque, R. E., on replacement reactions, 1229
Ph-Zn-S system, 690
The Peg Claims, spodumene pegmatites, Maine (Sundelius), 84–106
Pegmatites, border zones, 92
cores, 92
internal structure, 92
the Peg claims, spodumene, Maine (Sundelius), 84–106
size, shape and attitude, 90
wall zones, 92
Pek, A. B., book by reviewed, 460
Perthite, alkali content, 98
Petrofabric diagrams, tin mines, Transvaal, 405, 409, 410
Petrographic examination, tropical aluminous soils, 141
Petrography, Guiana shield, Venezuela, 81
of the Marl Slate of S. E. Durham, England, chemistry and (Hirst and Dunham), 912–940
Petrological study and microscopic examination, coal, 1093
Petrology, geology and iron deposits of the Guiana Shield, Venezuela (Stam), 70–82
N. W. Malaya, 587
and rock types, 332
Rooiberg and Leeuwpoort tin mines, Transvaal, South Africa, 527–557
of Talcher Coals (Pareek), 1089–1108
Pettijohn, F. J., on arkoses, 527
Phase diagram, ternary systems in system Cu-Fe-As-S, 493
system Cu-Fe-As-S, 485, 497, 498
system Cu-Fe-S, 486
Phase equilibria in the system Cu-Fe-As-S, (Gustafson), 667–670
studies, system Cu-Fe-As-S, 483–504
the sulfur-rich portion of the Fe-Ni-S system (Clark and Kullerud), 853–885
Phase relations, graphical presentation of system Cu-Fe-As-S, 668–670
Phase rule, 689
Phase systems including whole mining districts, 502
Philippines, geology and mineral deposits of East-Central Balabac Island, Palawan Province (John), 107–130
Photogeology, 479

Photograph, bauxite filled sink hole, 65
bauxite on limestone, 66, 67
bauxite occurrences, 257, 258, 259, 260
Botryoidal manganese ore of Kutingi mines, 574
Cerro Bolivar, Venezuela, 220
core orientation technique, 1318
crustal ores, Cerro Bolivar, Venezuela, 229
of fluorite from Deardorff mine, 892
fluorspar manto structures, 1048
iron ores, Cerro Bolivar, 232
laboratory coring apparatus for coal, 792
metamorphic rocks, Venezuela, 76
orienting core barrel, 1316
outcrop of iron formation, Venezuela, 224
outcrop of iron ores, Venezuela, 228
outcrop kaolin deposit, 241, 242
pegmatites, Maine, 91
replacement tin ore-bodies, Transvaal, 400
tourmaline segregations in the granite, 590
Photomicrograph, chalcocite, 650
chalcocite replacing calcite, 649
chalcocite veinlet, 651
coal, 1094, 1096, 1098, 1100, 1102, 1103, 1104, 1106
colloform texture in manganese ores, 574
copper grain rimmed by silver, 656
copper sulfides, 59
fluid inclusions, 176
inorganic pyrite, galena spheres, 999
iron formation, 225, 226
manganese ores, 436
native copper with carbonaceous material, 656
native copper in precambrian ash-flow tuff deposit, 798
of polished section of Marl Slate, 918
polished surfaces, silver ore, 1200, 1204, 1206, 1208
polished surfaces of tungsten ore, 1292
prehnite amygdule, Keweenawan extrusive, 798
pumice from ash-flow tuff, 799
relict ilmenite lamellae in sphene, 336
replacement of breccia by quartz, 650
replacement of chalcocite by bornite, 662
resinite in coal, 265–269
resorbed feldspar from ash-flow tuff with native copper, 799
spodumene pegmatites, 94
tin ore, 544
tourmaline and cassiterite, 534
Photo, Snake fault, 1280
Physical properties, cuprian coloradoite, 596
Physiography, Midnapur coast, West Bengal, India, 419
Pickering, R. J., on solubility at low pH's, 1269
on tropical podzolization, 1306
Pienaar, P. J., on Rhodesian copperbelt, 382
Pinger, A. W., review by, 1176
Pirow, H., on pebble distribution and paystreaks in East Rand, 966
Plagioclase altered to saussurite, 335
anorthite variation, in a pegmatite, 99
"Polarity" and concretion formation, 1275
Polished surfaces of biotite, 1128
Polubarinova-Kochina, Ya., book by, reviewed, 470
Port Gentil, 789
Pospelov, G. L., on objective of geochemical and geophysical work, 479
Postmasburg, 776
Powell, A. R., on organic sulfur in coals, 721
Pozzolans by activity types, classification of, 706–708
chemical characteristics of, 705–706
clayey, 707
of diatomite, 707
geological and physical characteristics of, 704
materials for, in North Central California, 712
in North Central California, geology and technology of some natural (Faick), 702–719
selecting and testing, 708
types of, 704
use of, 703
volcanic ashes, tuffs, and pumicites, 706–707
Precambrian, Venezuela, 71
Precipitation of metals, 1149
Precision of analytical methods, 1135
Prentice, J. K., on galena, silver content, 965
on gold, silver, and pyrite content of Witwatersrand, 954
Pressure, temperature, composition relations system, Fe-Ni-S, 864
Primary magmatic solutions, 1075–1076
minerals, Indian manganese deposits, 435
ore, 576
Principles of Geostatistics (Matheron), 1246–1266
Prospecting for bauxite, practical implications, 1006
Psilomelane, 438
Pulacayo stock, Bolivia, 981
Pyrite, 125, 333, 537, 550, 854, 1201
-enargite, 494
geological implications, 881
mineralization, 1116
native arsenic, 492
-orpiment, 492
-realgar, 492
from Renison Bell and Mt. Bischoff, Tasmania, thermoelectricity and resistivity of (discussion), 290–294
spheres, a further remark on biogenic sulfides: inorganic (discussion), 998–999

Pyrite—*Continued*
spheres, inorganic genesis, 999
-tennantite, 494
-vaesite assemblages, 883
Pyrolusite, 438
Pyroxene-amphibolite host rock, magnetite, 738
Pyroxene, Cerro, Bolivar, 226
Pyrrhotite, 537, 550
-arsenopyrite-loellingite, 492
-domeykite, 496
pyrite-arsenopyrite, 492

Quality of data on silver content, 953–954
Quartz, 335, 531, 552, 553, 1293
-albite pegmatites, 336
fluid inclusions in, 184, 369
infrared absorption and reflection, 275
veins, Sangdong mine, 1296
Quartzite, ferruginous, 81
Quaternary system, Cu, Fe, As, S, 494
Quebec, molybdenite paragenesis at the Lacorne mine (communication), 1340–1344

Radelli, L., discussion by, 1350
Rader, L. F., Coats, and Goss, *Distribution of fluorine in unaltered silicic volcanic rocks of the Western conterminous United States*, 941–951
Radioactivity in the Mosaboni copper mine, Bihar, India, distribution of (Gangadharam, Kameswara, and Aswathanarayana), 506–514
Radkevich, E. A., et al., book by reviewed, 461
Radtke, A. S., *Data on cuprian coloradoite from Kalgoorlie, Western Australia*, 593–598
Rainfall, S.E. Johore, 1269
Ramberg, H., iron and magnesium ions in silicate structures, 756
Ramberg, Hans., on pegmatite variations, 90
Ramdohr, P., on bornite from Cornwall, 540
on loellingite or arsenopyrite with native arsenic, 491
on loellingite and pyrrhotite, 492
on magnetic and nonmagnetic cassiterite, 533
on manganese ores, 434
on remobilization during palingenetic fusion, 1081
on sphalerite, 974
on whitneyite, 487
Ramsdell, L. S., on algodonite, 487
Ramsdellite, 1311
Rao, K. K., Aswathanarayana, U., and Gangadharam, E. V., *Distribution of radioactivity in the Mosaboni copper mine, Bihar, India*, 506–514
Rast, N., book edited by reviewed, 1015
periodical translation edited by, 1015
Ray, J. E., on copper sulfides, 53
Reaction vessel, filling the, 1057
Read, H. H., book by reviewed, 1176
Realgar, 487
Recrystallization of sulfide precipitates, 58
Red-beds copper deposits, 1154
Reeves, C. C., Jr., *Economic geology of a part of the Hillsboro, New Mexico, mining district*, 1278–1284
Geology of A.P.I. Project 49 kaolin clay reference locality, Mesa Alta, New Mexico, 237–249
Re-Examination of some suggested mechanisms for remobilization of sulfide ore bodies (Sorensen), 1071–1087
Refractive indices of amphibolite minerals, 741
Regional distributions of fluorine, 949
Regionalized variable, notion of, 1248
Reinecke, L., on pebble distribution and paystreaks in East Rand, 966
Reinhard, M., and Wenk, E., on Borneo geology, 113
Relation of iron and manganese in sedimentary iron formations (Lepp), 515–526
Relationship between sulfur in coals and the occurrence of marine roof beds (Williams and Keith), 720–729
Remobilization by heat and gases, 1079
by hydrothermal dissolution and redeposition, 1074
of sulfide ore bodies, a re-examination of some suggested mechanisms for (Sorensen), 1071–1087
Renault, J. R., *Molybdenite paragenesis at the Lacorne mine, Quebec* (communications), 1340–1344
Reorganizing stage, 1112
Replacement, evidence for, 997
reaction, kinetics of a (Ames), 1229–1236
stage, 1112
Resinite, 1101
bands, occurrence of, 267
in bituminous coals, the occurrence of (Jones and Murchison), 263–273
optical character of, 264
Reviews
Basic problems in geotectonics (Belousov, V. V., Ed.), 634
Beryllium, Evaluation of deposits during prospecting and exploration work (Beus), (Page Ed.), 156
Beryllium and uranium mineralization in Western Juab County, Utah (Sharp and Williams), 1176
Das Uran and sein geschichte (Kirchheimer), 1354
Economic Geology U.S.S.R., Nos. 1–2, 1960 (Rust Ed.), 1015
L'Evolution de la Lithosphere. Vol. IV Glyptogénèse (Termier and Termier), 156
Geochemistry in Mineral Exploration (Hawkes and Webb), 469

Reviews—Continued
Geological Survey Research 1962, 470, 826
The geology of Africa (Furon), 1017
The geology of Egypt (Said), 303
Gesteins—und Lagerstattenbildung im Wandel der wissenchaftlichen Anschauung (Petrogenesis and ore formation in the mirror of changing scientific views) (Fischer), Otvos, 155
Introduction to geology, vol I, principles (Read and Watson), 1176
Iron ore deposits of Bihar and Orissa and planning for their development (Nandy and Subramanian), 1174
Journal of hydrology, 1016
Langinscheidts' new Muret-Sanders encyclopedic dictionary, part I, English-German (Springer), 302
Map of the mineral deposits of France, 469
1961 minerals yearbook, 1016
Osnovy tektoniki Kitaka (The principles of the tectonics of China), 631
Reconnaissance geology of part of West Pakistan, 826
Relation of ore deposition to doming in the North American Cordillera (Wisser, E.), 825
Russian-English dictionary, 2nd edit. (Callahan), 826
Sedimentary petrography, 4th edit. (Milner with Ward and Higham), 302
Stratiform copper deposits in Africa (Lombard and Nicolini, Eds.), 632
Stratigraphic history of Africa south of the Sahara (Haughton), 1016
Structural geology of North America, 2nd edition (Eardley), 825
A study of pyrochlore (van der Veen), 1015
The Sudbury ores: their mineralogy and origin (Hawley), 155
Survey of the mineral industry of Southern Africa (Toombs), 827
The tectonics of the Canadian shield (Stevenson), 302
Theoretical petrology, 2nd edit. (Barth), 469
Theory of ground water movement (Polubarinova-Kochina), 470
Urans—geochemie und lagerstättenkunde (Dybek), 634
Reviews of Russian Books
Atlas of coals of the Moscow basin (Yablokov), 1167
Atlas of maps of the coal accumulations of the U.S.S.R. territories (Gorsky, Ed.), 1168
Atlas of structures and textures of sedimentary rocks, Khabakov, A. V. (Khabakov, Ed.), 1167
The bedding of sedimentary rocks (Botvinkina), 146
Reviews—Continued
The Biogeochemical method of prospecting for ore deposits (Malyuga), 1352
The determination of the principal structures and textures of ores (Isaenko, M. P.), 461
Fundamental questions of geotectonics (Belousov), 147
The gabbro-peridotite-dunite belt of the middle Urals (Vorab'eva, O. A., et al.) 462
The geological structure of the ore-field and deposits of Tyrny-aus (Pek, A. B.), 460
Geology and metallogeny of the type ore districts of Primar'ya (Radkevich et al.), 461
Geology of the U.S.S.R. (Nalivkin), Davidson, 1352
Hydrochemical methods of prospecting in arid and semi-arid regions (Belyakova), Davidson, 146
Introduction to geological microbiology (Kuznetzov, S. S., et al.), 460
Magmatic formations of the Kola peninsula, 147
Magmatism of the near-polar and polar Urals (Sirin, N. A.), 461
Mineralogical collection, 1354
The oldest rocks of China, 146
The Origin of stratificated (sic) lead and zinc deposits (Konstantinov), 1353
Petrographical dictionary (Levinson-Lessing), 1352
Petrography of eastern Siberia (Afanasiev, G. D.), 460
Physico-chemical investigations of sedimentary iron and manganese ores and their associated rocks (Listova and Sokolova), 148
Polyglot dictionary of mineral species and varieties (Hakhimzhan), 1167
The principles of the territories of China (Map), 631
Problems of planetary geology, 1353
Problems of the study of hydrothermal ore deposits (Vol'fson), 1168
The Profession of geologist (Malakhov), 1354
Rare-earth pegmatites of Alakurtti and pri-Ladoga (Kalita), 147
Structural conditions of formation of ore deposits (Belevtzev), 147
The structure and conditions of formation of the Dastakertsk copper-molybdenum deposit (Karamyan), 148
The structures of ore fields (in folded regions) (Velikiy), 147
Reviews of Russian Periodicals, see *Geologiya Rudnykh Mestorozhdenii*, 146
Rhodesian shield, mineralogenic belt, 778
Richard, L. M., *The composition and constitution of red and yellow soil earths that may be substituted for bauxite in*

Richard, L. M.—*Continued*
certain industrial operations (communication), 138–142
Richter, D. H., and Ingerson, E., on leakage in inclusions, 895
Ridge, J. D., on Iron Mtn., Mo., 341
Roan Antelope, 780
Roberts, W. M. B., *The low temperature synthesis in aqueous solution of chalcopyrite and bornite*, 52–61
Roedder, E., on composition of fluid inclusions, 889
Studies of fluid inclusions II: freezing data and their interpretation, 167–211
Roedder, E., and Ames, L. L., on primary magmatic solutions, 1076
Roedder, E., Ingram, B., and Hall, W. E., *Studies of fluid inclusions III: extraction and quantitative analysis of inclusions in the milligram range*, 353–374
Ronov, A. B., and Ermishkina, A. I., on manganese content of rocks, 517
Rooiberg and Leeuwpoort tin mines, Transvaal, South Africa (Leube and Stumpfl), 527–557
Ross, V., on digenite and tennantite, 488
Rotation properties, measurement of, 1309
Rove, Olaf N., *Brief comments on the art and science of economic geology*, 477–482
Roy, M. M., paper by discussed, 1347
Studies on coal macerals, 347–352
Roxstrom, Eric, on Craelius core orientating device, 1315
Ruckmick, J. C., *The iron ores of Cerro Bolivar, Venezuela*, 218–236
Rudroff, A., on Bulacayo stock, 981
Ruhuhu, 785
Rutile, 550

Said, R., book by reviewed, 303
Sales, R. H., paper by discussed, 145, 292
on Rhodesian copperbelt, 444, 609
Sales, R. H., and Meyer, C., on Butte, 501
on copper sulfides, 486
on metamorphism of Butte veins, 698
Salisbury, 779
Salt dome deposits of uranium, 850
Sample collecting from monzonitic stocks, biotite, 1127
collection, of water from fluid inclusions, 893
preparation, fluid inclusions, 893
preparation, 1127
Sampling procedure, 1059
Sandell, E. B., and Goldich, S. L., on copper of basic igneous rocks, 1141
on Zn in igneous rocks, 974
Sandstone, Balabac Island, Philippines, 111
type, uranium deposits, 1150
type uranium ore deposits, concepts of genesis of (Adler), 839–852
San Francisco mining district, biotite, 1133
San Juan basin belt, 1150
Santos-Yñigo, L., on Philippine copper deposits, 128
Schaller, W. T., on zeolite cavities, 207
Scheelite, 536, 1291
Schist, biotite, 82
quartz-biotite-muscovite, 89
Schmedeman, O. C., on metals as halides, 1080
Schneiderhöhn, H., on kieskugelchen, 920
on Postmasburg, 439
Schneider-Scherbina, A., discussion by, 456–459
discussion of paper by, 1348–1350
Schoeller, W. R., and Powell, A. R., on villimaninite, 855
Scholtz, D. L., on sphalerite in sulfide pellets, 975
Schouten, C., on copper sulfides, 53
on pyrite framboids, 920
Schröcke, on cassiterite, 533
Schwellnus, J. E. G., on Rhodesian copperbelt, 379
Screen analysis, aluminous tropical soils, 139
Secondary magmatic solutions, 1074–1075
minerals, Indian manganese deposits, 438
ore, 576
Section, bauxite horizon in S.E. Johore, 1268
columnar, bauxite, 1302
columnar, White Pine stratigraphy, 646
Don Tomas vein, assay width products for lead, 1062
Don Tomas vein, workings, 1062
and geophysical anomaly plot, 120
geologic, Balabac Island, Philippines, 116
geologic block, manto fluorspar, 1045
geologic, copper orebody, Balabac Island, Philippines, 122
geologic, details of fluorspar manto, 1046
geologic, detail of folding, Roan Antelope, 385
geologic, Mufulira, detail of deposit, 384
geologic, Sangdong tungsten mine, 1290
geological, tin mines, Transvaal, 403
geology, Cerro Bolivar, 222
showing aquifer transmitting water of compaction, 1148
stages in formation of manto type deposits, 1050
stratigraphic, Transvaal, 393
structural and aeromagnetic, Cerro Bolivar, Venezuela, 79
structural, strain ellipsoid analysis of movement, Pulacayo, Bolivia, 983
through kaolin field, 771
through laterite, generalized, vertical, 771
Sedgwick, A., on Marl Slate, 913
Sedimentary iron formations, the relation of iron and manganese in (Lepp), 515–526
Sedimentation during Marl Slate-Kupferschiefer time, 935

Self potential survey, Balabac Island, Philippines, 118
Sericite, 1293
Sericitization, 1294
Shabanie, 778
Shales, destructive distillation of carbonaceous, Iowa (Arnold and La Rose), 212–217
Shams, F. A., *Lead mineralization in the Abbottabad area, Hazara district, West Pakistan* (communications), 605–608
Sheperd, E. S., on fluorine in obsidians, 943
Shepard, F. P., and Moore, D. G., on sulfide ion concentration in bottom waters, 722
Shinkolobwe, 780
Shipek, C. J., on manganese nodules, 39
Siebenthal, C. E., on Joplin ores, 174
on metals in solution, 1146
on origin Miss. Valley deposits, 887
Silicification, 1294
Silver in "contact" reefs, and that in underlying Witwatersrand reefs, relationship between, 961
content of bullion as a function of grade of sample, variation in, 954
content of bullion, and grade of sample, inverse relationship between, 965
content of composite bullion produced by selected Witwatersrand mines, 962
content with depth of ore, variation of, 966
content of gold within individual reefs, 955
-copper-halide system, 1124
gold ratios in some Witwatersrand conglomerates (Hargraves), 952–970
mineralization in the Mineral district, Washington County, Idaho (Anderson), 1195–1217
Sims, P. K., on magnetite ore—localized along zones of microbrecciation, 753
Singewald, J. T., on tin deposits, 291
Singhal, B. B. S., *Occurrence and geochemistry of ground water in the coastal region of Midnapur, West Bengal, India*, 419–433
Sirin, N. A., book by reviewed, 461
Sizing, 576
Skinner, B. J., on fluid inclusions, 895
Skinner, B. J., Adler, I. and Mead, C. W., abstract by, 1188
Skropyshev, A. V., on primary magmatic solutions, 1076
Slichter, L. B., on difference between prospecting and the insurance business, 480
Smith, C., on mineralogy of carbonatites, 988
Smith, F. G., on gas solvent properties, 1079
Smith, F. G., and Little, W. M., on fluid inclusions, 190
Smith, W. S. T., on origin Miss. Valley deposits, 888
Snelgrove, A. K., review by, 1176
Snyder, F. G., and Wagner, R. E., on iron mineralization and basic dikes in Missouri, 340
Society of Economic Geologists, joint meeting with the A.I.M.E., Feb., 1963, abstracts of papers presented, 162–164
Doyle, R. G., *Recent developments in base metal exploration in the northern Appalachians* (abstract), 163
Hagni, R. D., and Grawe, O. R., *Mineral paragenesis in the Tri-state district, Missouri, Kansas, Oklahoma* (abstract), 162
Holbrook, D. F., and Williams, N. F., *Ore deposit geology of the Ouachita Mountains of Arkansas—a review* (abstract), 162
Stone, C. G., and Sterling, P. J., *Igneous rocks of Arkansas as related to mineral deposits*, 164
Society of Economic Geologists, Abstracts of papers given, November, 1963, New York meeting
Adler, A., and Barton, P. B., Jr., *Application of the electron probe to the analysis of (Zn,Fe)S solid solutions*, 1181
Application of the electron probe to the analysis of (Zn,Fe)S solid solutions, (Adler and Barton), 1191
Barton, P. B., Jr., and Toulmin, P., 3rd, *Sphalerite phase equilibria in the system Fe-Zn-S between 580°C and 850°C*, 1181
Behre, C. H., Jr., *The cause of mineralogenic provinces*, 1180
Brett, R., *Experimental data from the system Cu-Fe-S and their bearing on exsolution textures in ores* (abstract), 1181
Bryers, W. E., and Behre, C. H., Jr., *The Mesa Central of Mexico, a classic mineralogenic province* (abstract), 1180
The cause of mineralogenic provinces (Behre), 1181
Chico, R. J., *Submarine slumping and ore genesis discussion, Diamond No. 2 Mine, Gallup, New Mexico*, 1181
Cleveland, J. H., and Vitaliano, C. J., *Magnesite mineralization at Gabbs, Nevada* (abstract), 1181
Dorr, J. Van N.,II, *Origin of high grade hematite ores of Minas Gerais, Brazil* (abstract), 1180
Experimental data from the system Cu-Fe-S and their bearing on exsolution textures in ores (Brett), 1190
The Fe-Ni-S system (Kullerd and Clark), 1188

Society of Economic Geologists—*Continued*
Hamblin, W. K., and Salotte, C. A., *Stereoscopic radiography in the study of ore textures* (abstract), 1181
Hoagland, A. D., Hill, W. T., and Fulweiler, R. E., *Observations relating to the genesis of the Ordovician East Tennessee zinc deposits* (abstract), 1180
Incorporation of some trace elements by hydrothermally synthesized galena and sphalerite (Wright, Hutta and Barnard), 1192–1193
Jolly, J. L., and Heyl, A. V., *Zoning in the central Kentucky mineral district* (abstract), 1180
Kullerud, G., and Clark, R. A., *The Fe-Ni-S system* (abstract), 1181
Magnesite mineralization at Gabbs, Nevada (Cleveland and Vitaliano), 1186
McAnulty, W. N., and Levinson, A. A., *Rare alkali and beryllium mineralization in volcanic tuffs, Honey Comb Hills, Juab County, Utah* (abstract), 1181
Moh, G., and Kullerud, G., *The Cu-Ni-S system* (abstract), 1181
Origin of high grade hematite ores of Minas Gerais, Brazil (Dorr), 1185
Phase relations among the copper arsenides and their application to geologic thermometry (Skinner, Adler, and Mead), 1188
Productive and barren jasperoids at Lake Valley, Sierra County, New Mexico (Young and Lovering), 1193
Rare alkali and beryllium mineralization in volcanic tuffs, Honey Comb Hills, Juab County, Utah (McAnulty and Levinson), 1187
Skinner, B. J., Adler, I., and Mead, C. W., *Phase relations among the copper arsenides and their application to geologic thermometry* (abstract), 1181
Snyder, F. G., and Gerdeman, P. E., *Explosive igneous activity along an Illinois-Missouri-Kansas axis in Paleozoic time* (abstract), 1180
The solubility of orpiment in Na_2S-H_2O solutions from 25° C to 200° C and 100 bars to 1500 bars pressure; with geologic implications (Weissberg, Dickson, and Tunell), 1187–188
Sphalerite phase equilibria in the system Fe-Zn-S between 580° C and 850° C (Barton and Toulmin), 1191–1192
Stability of some copper and iron sulfide assemblages (Yund and Kullerud), 1190
Stereoscopic radiography in the study of ore textures (Hamblin and Salotti), 1189–1190
Stoiber, R. E., and Dürr, F., *Vanadium in the sublimates, Izalco Volcano, El Salvador* (abstract), 1181
Society of Economic Geologists—*Continued*
Stringham, B., *Igneous rock types and host rocks associated with porphyry copper deposits*, 1180
Structure of gold-sulfide deposits in precambrian iron formation (Tolbert), 1185
Submarine slumping and ore genesis discussion—Diamond No. 2 Mine, Gallup, N. M. (Chico), 1193
Tolbert, G. E., *Structure of gold-sulfie deposits in precambrian iron formation, Kaposo Mine, Brazil*, 1181
Vanadium in the sublimates, Izalco Volcano, El Salvador (Stoiber and Dürr), 1186
Weissberg, B. G., Dickson, F. W., and Tunell, G., *The solubility of orpiment in Na_2S-H_2O solutions from 25° C to 2000° C and 100 bars to 1500 bars pressure; with geologic implications*, 1181
Wright, H. D., Jr., Hutta, J. J., and Barnard, W. M., *Incorporation of some trace elements by hydrothermally synthesized galena and sphalerite*, 1181
Young, E. J., and Lovering, J. G., *Productive and barren jasperoids at Lake Valley, Sierra County, New Mexico*, 1181
Yund, R. A., and Kullerud, G., *Stability of some copper and iron sulfides*, 1181
Sokolova, E. I., book by reviewed, 148
Solid solution between chalcopyrite and tennantite, 494
effect of, 673–680
system Cu-Fe-S, 685
Solid state diffusion, 1082
Solubilities, ore solution chemistry. I. experimental determination of mineral (Barnes), 1054–1060
Solutions, character of, 1213
Some basic considerations in the application of infrared spectroscopy to mineral analysis (Adler), 558–568
Sorby, H. C., on fluid inclusions, 197, 888
Sorensen, A. H., *A re-examination of some suggested mechanisms for remobilization of sulfide orebodies*, 1071–1087
Source fluid changes in fluid inclusions, 199
Source of magnetite ore, Scott Mine, Sterling Lake, N. Y., host rock as a (Hagner, Collins, and Clemency), 730–768
metals, formation water as a, 1146
the minor elements—Marl Slate, 937–938, 939
ore material, 758
the supergene elements, 1124
Sonrirajan, S., and Kennedy, G. C., on critical point effected by solutes, 198
South Africa mineralogenic belt, 776
South Africa, the Rooiberg and Leeuwpoort tin mines, Transvaal, in two parts (Leube, Stumpfl), 391–418, 527–557

Space relations of mineral deposits, 318
Spectrographic analysis, biotites, 1128
of rocks and minerals, 750
Spectrographic procedure, manganese samples, 3
Sphalerite, 125, 540, 1202
in basic rocks and related ore deposits, 975
fluid inclusions, 369
and the geochemistry of igneous rocks, 973
identification, 971
in Missouri basic rocks, magmatic (Desborough), 971–977
origin of, 973
Sphene turbid, 335
Spinks, J. W. T., on isotopic fractionation through autochromatography, 326
Spodumene, alkali content, 98
pegmatites, Maine, the Peg Claims (Sundelius), 84–106
Sriramadas, A., *The manganese ores of Kutingi Mines, Koraput district, Orissa, India*, 569–578
Stach, E., on resinite in coal, 264
Stam, J. C., *Iron deposits, geology and petrology of the Guiana Shield, Venezuela*, 70–82
Stannite, 1205
Stanton, R. L., on sulfides through structural breaks, 1084
Statistical comparison of base metal concentration populations, 1135
concepts, insufficiency of classical, 1247–1248
formulae, 1252–1259, 1263
methods to establish precision, 1135
methods and results, metal distribution analysis, 1063
Steinike, K., article by discussed, 999
Stellwell, F. L., and Edwards, A. B., on replacement of loellingite by arsenopyrite, 492
Stephans, E. A., on Borneo geology, 113
on copper in Borneo, 130
Stereographic projection solution of the two drillhole problem, a simplified (discussion), 618–621
projection used to orient drill cores, 1322
Sterling Lake, N. Y., host rock as a source of magnetite ore, Scott Mine (Hagner, Collins, and Clemency), 730–768
Sterling, P. J., abstract by, 164
Stetsenko, V. P., article discussed by, 815–816
Stevenson, J. S., book by reviewed, 303
Stieff, L. R., Stern, T. W., and Milkey, R. G., on dated uraninite in Colorado Plateau, 320
Stockwerk effect, 1249
Stone, C. G., abstract by, 164
Stone cells, 1097
Stone, H. W., on fluid inclusions, 194
on solubility of water in carbon dioxide, 188
Stratification effect, 1249
Stratigraphic column, Bihar, India, 508
Stratigraphy, A.P.I. project 49 kaolin locality, 240
Buenavista-Encantada and El Tule districts, Northern Mexico, 1039
Dakota formation, New Mexico, 240
Korean sheelite mine, 1286
Morrison formation, New Mexico, 243
Strauss, C. A., on cassiterite pipes, 531
Strike variation and manganese ores, 573
Stringham, B., on Bingham, 178
Strontium in the Marl Slate, 933
Structural control of manganese ore, 573
and economic geology, a new nomogram for the solution of problems in (Leney), 1326–1339
geology of Pulacayo Mine, Bolivia (Lyons), 978–987
origin of the fissures, Pulacayo, 984
preparation of host rock, 753
Structure, area around Rooiberg, Transvaal, 395
Balabac Island, Philippines, 114
Cerro Bolivar, Venezuela, 221
fine, of the ore-bodies, Rooiberg, Transvaal, 398
fine, of the tin ore bodies, Leeuwpoort, Transvaal, 411
Guiana shield, Venezuela, 80
internal, fluorspar mantos, 1047
Leeuwpoort area, Transvaal, 401
Nieuwpoort Mine, Transvaal, 417
northern Coahuila, Mexico, 1040
Pulacayo area, Bolivia, 982
Sangdong tungsten mine, Korea, 1287
at the Scott Mine, 737
of Vellefontein area, Transvaal, 415
Struve, E. A., book by reviewed, 1352
Studies on coal macerals, Roy, M. M., 347–352
of fluid inclusions III: extraction and quantitative analysis of inclusions in the milligram range (Roedder, Ingram, and Hall), 353–374
of fluid inclusions II: freezing data and their interpretation (Roedder), 167–211
Stumpfl, E. F., and Leube, *Rooiberg and Leeuwpoort tin mines, Transvaal, South Africa*, two parts, 391–418, 527–557
Stutzer, O., and Noe, A. C., on variation in sulfur in coal, 721
Suggatt, R. P., and Wellman, on sulfur content of coals, 721
Sulfide orebodies, a re-examination of some suggested mechanisms for remobilization of (Sorensen), 1071–1087
ores in the Mildren and Steppe mining districts, Pima County, Arizona, oxidation of (Williams), 1119–1125
ores, the system Cu-Fe-As-S, mineral assemblages in (McKinstry), 483–505
replacement, massive deposit, 124

Sulfur in coals and the occurrence of marine roof beds, relationship between (Williams and Keith), 720–729
rich portion of the Fe-Ni-S system, the (Clark and Kullerud), 853–885
Sullivan, C. J., on hydrothermal solutions invalid, 1081
Sullivan lead-zinc mine, 448
Sun chart, compass corrections for reconnaissance mapping and geophysical prospecting in areas of magnetic disturbance (Fraser), 131–137
Sunagawa, I., on hematite crystals, 1342
Sundelius, H. W., *The Peg Claims spodumene pegmatites, Maine*, 84–106
Supergene elements, the source of, 1124
Surinam, in relation to underlying unconsolidated sediments suggesting two-step origin, bauxite deposits of British Guiana and (Moses and Michell), 250–262
Swayze, D. R., *Chemical kinetics and the formation of mineral deposits* (communications), 604–605
Syngenetic deposition, the Northern Rhodesian copperbelt, is it a classic example of (Gillson), 375–390
deposits, characteristics of, 329
lithogene, epigenetic, and diplogenetic deposits (Lovering), 315–331
origin, Mississippi Valley type deposits, 888
Synthesis in aqueous solution of chalcopyrite and bornite, the low temperature (Roberts), 52–61
System Cu-As-S, 490
Cu-Fe-As-S—mineral assemblages in sulfide ores, the (McKinstry), 483–505

Table, abbreviations used in phase diagrams, 673
alkali content, pegmatite, specimens, 99
alkali content, spodumene pegmatite, 97
analyses of bauxite, 1304
analyses, coal, India, 1093, 1107
analyses of Durham Marl Slate, 915
analyses of kaolins, 246
analyses of magnetite ore, 734
analyses mineralization Mexican fluorspar, 1044
analyses of oil field brine, 903
analysis and petrographic purity of the macerals, 348
analyses of quartzites, Rooiberg, Transvaal, 529
analytical results bulk crushing fluid inclusions, 365
anorthite in plagioclase, 100
assay results of grab samples, Minnesota copper prospects, 796
average fluorine content of rocks, 948
bauxite, components vs, bedrock, 1304
bauxites, terra rossas and limestones, Mediterranean area, chemical analysis, 68
Table—*Continued*
biotite in stocks compared, 1139
boiling points, organic solvents, 1001
bornite and covellite, synthetic and natural, interplanar spacings, 60
boundary reactions and slopes in the system Cu-Fe-As-S, 678
bravoite breakdown data, 879
calculation of iron released from pyroxene amphibolite, 760
cation ratios, ground water, 430
chalcocite and native copper in different lithologic units, 659
chalcopyrites compared with natural material, interplanar spacings of synthetic, 56
chemical analyses of Jamaican limestones and bauxite, 64
chemical analyses of mine and well waters, 1121
chemical analyses of parent rock types of bauxite, 1272
chemical analyses of residual bauxite, 1272
chemical compositions of manganese ore, 575
chemical composition, spodumene pegmatite, 98
chemical elements distribution with manganese, 39–47
clays in New Mexico samples, 244
comparison of the data, fluorine content of various rocks, 948
composition and cell edge data, bravoites and nickeliferous pyrites, 881
composition of ferruginous quartzites, 77
composition of fluid inclusions from Cave-In-Rock fluorite district, Illinois, 898
composition of fluid inclusions from upper Mississippi Valley zinc-lead district, 900
composition of a gabbro and two chondrites, 280
composition of materials in fluorite inclusions, 181
compositions, shales and pegmatites compared, 102
correlation coefficients of Mn/Fe ratios, Fe^{++}/Fe^{+++} ratio for ironstones, 522
data bearing on pyrite-vaesite, vapor region at 700° C, 863
data for the curve of time vs. percent gypsum reacted, 1232
data on magnetite titrimetric analysis, 747
data, vaesite solvus curve, 872
dimensions, fluorspar mantos, 1046
dip of foliation from drill cores, 737
dispersion in kermesite, 1311
elements in manganese deposits, 36
element migration during alteration, 337
extractability in different solvents of macerals, 348

Table—*Continued*
fluid inclusions, freezing stage data, 170–173
freezing temperatures of fluid inclusions, 902
from fresh to altered rock, mineralogical changes during alteration, 337
groups of cycles in Africa, 775
heating experiments on synthetic bravoites, 874
heavy mineral concentrations, Florida, 1241
heavy mineral grain sizes, 1242, 1243
helium ages, magnetite, 144
hydrothermal development, 1117
infrared analysis of chromatographed extracts of coal macerals, 349
infrared spectra of coal, 350
infrared spectra olivine, 282
interplanar spacings, bornite and covellite, synthetic and natural, 60
interplanar spacings chalcopyrite, natural and synthetic, 56
iron in minerals, 338
iron in minerals by titrimetric analysis, 748
Jamaican limestones and bauxite, chemical analyses of, 64
Jamaica red and yellow earths, 141
kaolin, chemical analysis, 772
localities of samples of Marl Slate, 914
materials investigated for pozzolanic properties, 711
major, minor and trace elements for some carbonate rock assemblages, 989
metal deficiency of monosulfide solid solution at 700° C, 863
microanalysis of fractions of macerals, 348
mineral composition of Marl Slate, 916
minor elements in the Marl Slate, 926
Mn/Fe ratios of aluminous laterite, 519
Mn/Fe ratios in iron formations, 519, 521
Mn/Fe ratios in various rocks and crustal units, 518
modal ilmenite plus magnetite-ulvöspinel in a Missouri sill, 333
modes, 334
modes diabases and gabbros S.E. Missouri, 334
mode, spodumene pegmatite, 96
monosulfide solid solution field with iron and nickel at 700° C, 863
Nb, Ta, Sc, Be and Ti in Siberian cassiterites, 538
optical and chemical data of tuffs, 711
paragenetic sequence in the Cave-In-Rock district, Illinois, 891
paragenetic sequence of mesogene and supergene minerals, 1120
paragenetic succession, Mineral district, Idaho, 1211
percent of minerals in mafic silicate fractions, 747
percentage of inclusion fluid recovered, 895
petrographic samples, Guiana Shield, Venezuela, 81
physical constants of some arsenates, 601
physical properties of coloradoite and cuprian coloradoite, 595
pozzolanic materials, 707
pozzolanic materials north central California, 712, 713, 714
precambrian, Venezuela, 72, 73
precipitation from aqueous solutions containing NiS_2 and FeS_2, 877
range in mineral percent, quartz monzonite gneiss, 733
relative rates of sedimentation, 930
rotation properties of ore minerals, 1310
silver content of auriferous conglomerates in Witwatersrand, 969, 970
spectrographic analysis, Bigelow Mine, 1282
spectrographic analyses, deep sea manganese nodules, 38
spectrographic analyses of hot spring apron oxides, manganese, 29–31
spectrographic analyses for hypogene sulfides, 1120
spectrographic analyses, hypogene vein oxides, manganese, 19–21
spectrographic analysis of minerals and total rock, 751
spectrographic analyses oil field brine, 904
spectrographic analyses, stratified oxides, manganese, 35, 36
spectrographic analyses of supergene oxides, manganese, 10, 11
spectrographic sensitivities, 4
radiometric data, Indian copper mine, 511
Rb and Sr in Leeuwpoort orthoclase, 548
reactive oxygenated groups in coal, 351
S^{32}/S^{34} ratios, hydrothermal mineral deposits, 844
S^{32}/S^{34} ratios from various sources, 843
rock sample descriptions, infrared spectra study, 283
rubidium in relation to potash and alumina, 933
shale distillate composition, 215
shale distillate, gas chromatography data, 216
shale distillation products, 214
statistical data metal distribution analysis, Don Tomas vein, 1067
statistical tests, for spectrochemical precision, 1136
statistics of sulfur in coal, 725, 726
stratigraphic succession, Northern Coahuila, Mexico, 1039
stratigraphy, Balabac Island, Philippines, 109
structural parameters of maceral concentrates, 350
thermochemical data on arsenic-bearing phases, 676

Table—*Continued*
thermochemical data on oxides and sulfides, 674
three phase assemblages in the system Cu-Fe-As-S, 500, 501
titrimetric analysis, 743
tonnage in fluorspar mantos, 1046
total titrimetric analysis, rock determined, 748
trace element contents in ppm, 929
trace elements in cassiterites, 533, 535, 537
trace elements in pyrites, 545
vacuum crushing and microanalysis of fluid inclusions, 368
water composition, 428
x-ray data, Mesa Alta kaolin, 247
x-ray powder data of cuprian coloradoite, 596
Tamatave, 786
Tarabev, S. I., on sulfide solubility, 179
Tarpon Springs, heavy mineral prospect, 1243
Tasmania, thermoelectricity and resistivity of pyrite from Renison Bell and Mt. Bischoff (discussion), 290–294
Tavora, E., on kermesite, 1311
Taylor, G. H., and Cook, A. C., on resinite in coal, 264
Technique, bacterial oxidation experiments, 992
collection of bottom samples for heavy mineral study, 1239
copper determination, 510
core orienting Odgers method, 1317
Experimental determination of mineral solubilities, 1054–1060
field procedure for dithizone testing for heavy metals, 579–586
Fluid inclusion sampling, 354
geochemical prospecting with dithizone, 579–586
laboratory, 892
for the laboratory coring of coal, a new (Jones and Bell), 791–795
phase equilibria study by hydrothermal methods, 859
preparation of magnetite ore and host rock, for analysis, 740
sample preparation, radiometric study, 509
separation and analysis, 1127
separation of heavy minerals, 1240
Solutions of the "Two drill hole problem," 618, 811
thermoluminescence measurement, 1219
Three point method of orienting underground specimens, 441–443
Technology of some natural pozzolans in North Central California, geology and (Faick), 702–719
Tectonic remobilization, 1084
Temperature of formation, spodumene pegmatite, 100
variable, 673
Temple, A. K., and Grogan, *Manto deposits of fluorspar, Northern Mexico*, 1037–1053
Tennantite, 488
arsenopyrite, 495
enargite, 489
loellingite, 496
Ter Meulen, J., on Guiana bauxites, 1002
Termier, H., and Termier, G., book by reviewed, 156
Ternary system, 493
Cu-As-S, 487
Cu-Fe-S, 485
Fe-As-S, 491
Tetradymite, 1293
Tetrahedrite, 1203
Teves, J. S., on Mindoro geology, 113
Texas, manganese, 18
Textures of the ores, 575
Thazimbi, 776
Theobald, P. K., Jr., on heavy minerals, *322*
Thermochemical framework, in system Cu-Fe-As-S, 674
Thermodyamics laws for the explanation of mineral zoning (discussion), 815–816
Thermodynamic models of hydrothermal ore formation, 688–699
Thermoluminescence in geothermometry, 1220
to geothermometry, the application of (Macdiarmid), 1218–1228
The Rooiberg and Leeuwpoort tin mines, Transvaal, South Africa (Leube and Stumpfl), 391–418
Thiessen, R., on formation hydrogen sulfide, *722*
on sulfur in coal, 720
Thiel, G. A., Grant, and Wolff, on high manganese associated with carbonate iron formation, 523
Thiobacillus ferrobacillus, 991
Thode, H. G., et al., on sulfur isotopes in petroleum, 842
Tin mines, Transvaal, South Africa, The Rooiberg and Leeuwpoort (Leube and Stumpfl), 391–418, 527–557
Tintic district: biotite, 1130
Titrimetric determination of total iron, 746
Tolbert, G. E., abstract by, 1185
Tolman, C., and Landes, K. K., on alkaline rocks in the midcontinent, 888
Toluene, danger discussed, 1000
Tomkieff, S. I., "aureole" versus "halo" (communications), 601–603
Toombs, R. B., book by reviwed, 827
Topographic control, residual bauxite, 1270
Tourmaline, 532, 548
breccia-pipes, 1117
greisenization in Langkawi, Northwest Malaya (Hutchison and Leow), 587–592
Turneaure, F. S., cassiterite after tourmaline, 532

Trace, R. D., on depth to Pre-cambrian in Illinois fluorite district, 890
Transformation stage, 1111
Transvaal, South Africa, The Rooiberg and Leeuwpoort tin mines (Leube and Stumpfl), 391–418, 527–557
Travertine deposits of manganese, 23
Truesdell, A. H., and Weeks, A. D., on uranium carried as carbonate complexes, 1147
Tsumeb funnel, 787
Tuffs in north central California, 714
Turner, F. J., on radiolarian cherts, 111
Two drill hole problem, 811–815

Uele gold-belt, 783
Uniformity in rocks sampled, degree of, 945
Unoxidized sandstone-type uranium ores, 840
Uranium in the Gas Hills area, Wyoming, source of (communication), 285–289
ore deposits, concepts of genesis of sandstone type (Adler), 839–852
ores, magmatic hydrothermal and fracture controlled, 847–849
in sediments, cyclic accretion of, 845
Uravan mineral belt, 1151
Utah, Bingham mining district, 1130
Gold Hill mining district, 1134
The Ibapah stock, 1134
Iron Springs district, 1132
manganese ore, 10–12, 22, 27, 28, 30, 32, 37
mineral range stock, 1133
Park City, Little Cottonwood, American Fork area, 1131
San Francisco and adjacent districts, 1133
Tintic mining district, 1129

Vaes, J. F., and Darnley, W. G., on Rhodesian copperbelt, 388
Vaesite, (NiS_2), 856
solvus curve, extrapolation of the, 871
Valozoro, 786
Van Alstine, R. E., on flotation mill capacity in northern Coahuila, 1038
Van Bemmelen, R. W., on copper in Timor, 128
Van Der Vien, A. H., review of book by, 1015
Van Kersen, J. F., on bauxites in Surinam and Demerara, 1002
van Straaten, L. M. J. U., on bacterial reduction of sulfate, 722
Vapor transfer, 1080
Variances of assay, width products, compared, 1068
and covariances, 1252
Variogram, The, 1250
Vegetation and porosity in S.E. Johore, 1270, 1271
S.E. Johore, 1268
Vein minerals, early, 650
late, 661
Vein systems at Pulacayo, Bolivia, 984
Some vein, wall rock relationships in the White Pine Mine, Ontonagon Co., Michigan (Carpenter), 643–666
Veins, fracture, filled, 649
Velikig, A. S., book by reviewed, 147
Vellefontein tin mine, Transvaal, 545
Venezuela, geology, petrology and iron deposits of the Guiana shield (Stam), 70
The iron ores of Cerro Bolivar (Ruckmick), 218–236
map, geology, northern part of Guiana shield, 71
Venice, Florida, heavy mineral prospect, 1244
Ventersdorp contact reef, 961
Villard, P., on carbon dioxide hydrate, 189
Vincent, E. A., and Phillips, R., on TiO_2 content of magnetite, 739
Vitrain, 1095
Vitri-fusinite, 1097
Vitrinite, 1099
Vitrinites, 347
Vokes, F. M., and Gammon, J. B., on Co-Ni ratios, 552
Volatile metal compounds in ore genesis, 1180
Volatilization of solids, 1080
Vol'fson, F. I., book by reviewed, 1168
von Eckermann's, H., discussion discussed, 446
Vonsenite, 1311
Vorob'eva, O. A., et al., book by reviewed, 462
Vredenburgite, 437
Vulcanite, 1311

Wade, W. R., on massive sulfide copper deposit near Cuba, 129
Wager, L. R., and Mitchell, R. L., on zinc in Skaergaard intrusion, 974
Wahl, A. C., and Bonner, W. A., on surface exchange of ions, 57
Wahler, W., on liquid inclusions, 889
Waksman, S., on anaerobic bacteria in peat bogs, 722
Waldschmidt, W. A., on flow structure in galena, 1084
Walker, T. L., on rhondalite, 572
Wallega, mineralogenetic belts of Africa, 783
Wandke, A., on effects of heating sulfides, 1082
Wandless, D. M., on organic and pyritic sulfur in coals, 721
Wankie, 779
Wanless, R. K., discussion by, 807
Ward, A. M., book edited by reviewed, 302
Waterman, G. C., on Jamaican bauxite, 286
Water table, S.E. Johore, 1270
Watson, J., book by, reviewed, 1176

Webb, J. S., book by reviewed, 469
Wedepohl, K. H., on Zn in silicates and spinels, 974
Wedepohl, K. R., on manganese nodules, 38
Weeks, A. D., and Eargle, D. H., on uranium in the Palangana salt dome, 850
Wehrenberg, J. P., on diffusion of zinc, 1229
Weibel, M., on ore deposits of Central Estremadura, Spain, 535
Weir, C. E., and Lippincott, E. R., on strength of cation-oxygen bond, 566
Weis, P. L., on fluid inclusions in beryl, 889
Weissberg, B. G., Dickson, F. W., and Tunell, G., abstract by, 1187–1188
Weller, J. M., on "coontail" fluorspar, 1051
Wellman, H. W., and Suggate, R. P., on sulfur content of coals, 721
Westoll, F. S., on fossils replaced by galena, blende, chalcopyrite and bornite, 916
White, C. H., on zonal arrangements of copper-iron, 450
White, D. A., Huber, and James, on Lake Superior iron formations, 516
White, D. A., and Thiessen, R., on sulfur in coal, 721
White, D. E., on hot springs, 179
on hydrothermal water, 888
White, J. C., and Wright, J. C., on mineralization at White Pine, 663
White Pine Mine, Ontonagon Co., Michigan, some vein-wall rock relationships in the (Carpenter), 643–666
White, W. S., and Northcote, K. E., on sulfide-rich muds, 321
White, W. S., and Wright, J. C., on the White Pine fault, 648
Whitehorse Pass stock: biotite, 1133
Whitneyite, 487
Wickman, F. E., on hydrogen and hydroxyl bonding, 1274
Wiese, R. J., Jr., on chlorite contained in Parting shale, 654
on copper in Parting shale, 661
Wilcox, R. E., and Poldervaart, A., on sphene rims around magnetite, 342
Wilkinson, J. F. G., on titanomagnetite altered to sphene, 342
Williams, E. G., and Keith, *Relationship between sulfur in coals and the occurrence of marine roof beds*, 720–729
Williams, E. G., on Lower Kittanning coal, 720
Williams, G. H., on leucoxene in the schists of the Menominee, 343
Williams, H., on tuffs of California, 714
Williams, H., Turner, F. J., and Gilbert, C. M., on fluorine in an Icelandic *pitchstone dike*, 943
Williams, N. F., abstract by, 162
Williams, S. A., *Oxidation of sulfide ores in the Mildren and Steppe mining districts, Pima County, Arizona*, 1119–1125
Stability relations of some arsenates of zinc and calcium (communications), 599–608
Willis, B., on fractures, 1157
Wilson, H. D. B., on zinc in magmatic sulfides, 975
Winfield, O., on Rhodesian copperbelt, 381
Wisser, E., book by reviewed, 825
on the two drillhole problem, 618–621
Witwatersrand, 448, 776
conglomerates, silver-gold ratios in some (Hargraves), 952–970
Woakes, M. E., discussion by, 446
Wolfe, J. A., on geostatistics, 480
Wolfenden, on groundwater pH, 1269
Wolff, J. F., Sr., Thiel, and Grout, on high manganese associated with carbonate iron formation, 523
Wolframite, 1291
Woody tissues, 1095
Wright, H. D., Hutta, J. J., and Barnard, W. M., abstract by, 1192
Wulfinite, 1121
Wurtzite, 1202
Wyoming, manganese, 32
Wyoming, source of uranium in the Gas Hills area (communication), 285–289

X-ray patterns, bravoite, violarite, and polydymite, 860
powder patterns, copper sulfides, 55
Xylene, danger, discussed, 1000

Yablokov, V. S., book edited by reviewed, 1167
Yellowknife, N.W.T., The origin of the gold-quartz deposits, 804–811
Yermakov, N. P., on fluid inclusions, 180, 198, 199
on inclusions, 168
Young, E. J., and Lovering, T. G., abstract by, 1193
Young, R. B., on gold telluride, 964
on the purity of gold, 954
Young, S. W., and Moore, N. P., on copper sulfides, 53
Yund, R. A., and Kullerud, G., abstract by, 1190–1191
on system Cu-Fe-S, 485

Zans, V. A., on Jamaican bauxite, 287, 817
Zechstein, 913
Zeolite inclusions, 206
Zeolitic pozzolans, 708
Zeschke, G., *Radiation surveys on nonradioactive deposits formed by descending solutions, use of* (communications), 995–996

Zeschke G.—*Continued*
Thermal glow tests as a guide to ore deposits (communications), 800–803
Zies, E. G., on analysis of sulfur, 856
Zies, E. G., Allen, E. T., and Merwin, E. H., on copper sufides, 53
Zimmer, P. W., *Orientation of small diameter drill core*, 1313–1325
Zimmerman, D. O., on Co/Ni ratios in pyrite, 539
Zinc in biotites, 1142
in biotites from basin and range quartz monzonites—copper, lead, and (Parry and Nackowski), 1126–1144
Zinc in biotites—*Continued*
and calcium, stability relations of some arsenates of (communications), 599–608
Zirconium and rubidium in the Marl Slate, 933
Zirkel, F., on fluid inclusions, 190, 888
Zobell, C. E., and Feltham, C. B., on bacterial reduction of sulfate, 722
Zoning, 501
alteration, 1113
in pyrite, 550
Sangdong mine, 1294

ECONOMIC GEOLOGY

AND THE

BULLETIN OF THE SOCIETY OF ECONOMIC GEOLOGISTS

EDITOR: ALAN MARA BATEMAN
Yale University, New Haven, Connecticut

ASSOCIATE EDITORS

M. LEROY JENSEN, *Yale University*
CHARLES MEYER, *Univ. of California, Berkeley*

BUSINESS EDITOR: MORRIS M. LEIGHTON
Illinois Geological Survey, Urbana, Illinois

ASSISTANT EDITORS

JOE W. PEOPLES, *Wesleyan University*
R. H. JAHNS, *Pennsylvania State University*
J. D. BATEMAN, *Toronto, Ont.*
FRANK M. VOKES, *Oslo, Norway*

BOARD OF ASSOCIATE EDITORS

D. F. HEWETT
U. S. Geological Survey, Menlo Park, Calif.

A. I. LEVORSEN
Tulsa, Okla.

J. E. HAWLEY
Queen's University, Kingston, Ontario

W. E. WRATHER
Washington, D. C.

A. N. SAYRE
U. S. Geological Survey, Washington, D. C.

L. C. GRATON
Orange, Connecticut

H. C. GUNNING
Vancouver, Canada

GEORGE W. MOREY
U. S. Geological Survey, Washington, D. C.

N. H. FISHER
Bureau of Mineral Resources, Canberra, Australia

PER GEIJER
Djursholm, Sweden

P. F. FOURMARIER
Liège University, Liège, Belgium

M. S. KRISHNAN
Osmania University, Hyderabad, India

T. W. GEVERS
University of the Witwatersrand, Johannesburg, S. Africa

C. F. DAVIDSON
St. Andrews University, Fife, Scotland

J. A. BROGGI
Instituto Geologica, Lima, Peru

TAKEO WATANABE
University of Tokyo, Tokyo, Japan

KONRAD B. KRAUSKOPF
Stanford University, California

PAUL RAMDOHR
University of Heidelberg, Heidelberg, Germany

VOLUME 58

NEW HAVEN, CONNECTICUT
THE ECONOMIC GEOLOGY PUBLISHING COMPANY
1963

SOCIETY OF ECONOMIC GEOLOGISTS

THE PUBLICATIONS OF WHICH CONSTITUTE
A PART OF THIS JOURNAL

OFFICERS FOR 1963

CHARLES F. PARK, *President*
ROGER H. MCCONNEL, *Vice President*
HAROLD M. BANNERMAN, *President-Elect*
CHARLES H. BEHRE, JR., *Vice President-Elect*
EUGENE N. CAMERON, *Secretary*, Science Hall, University of Wisconsin, Madison 6, Wisconsin
ROBERT M. GROGAN, *Treasurer*, Development Dept., Dupont Bldg., Wilmington 98, Delaware

Councilors

1963	*1964*	*1965*
ERNEST L. OHLE	HAROLD L. JAMES	WESTON BOURRET
FREDERICK S. TURNEAURE	JAMES P. POLLOCK	CARL FRIES, JR.
ALFRED W. JOLLIFFE	GEORGES ORDOÑEZ	FREDRICK C. KRUGER

HAROLD M. BANNERMAN, *President-Elect* — OLAF N. ROVE, *Past President*
CHARLES H. BEHRE, JR., *Vice President-Elect*

Regional Vice Presidents

BYRON B. BROCK, Africa — GERHARDUS L. KROL, Europe
MIHIR K. ROY CHOWDHURY, Asia — JAMES M. HARRISON, North America
LYNDON C. NOAKES, Australia — ROBERT D. BUTLER, South America

Executive Committee

CHARLES F. PARK, JR., *Chairman* — OLAF N. ROVE — ROBERT M. GROGAN
ROGER H. MCCONNEL — HAROLD M. BANNERMAN — EUGENE N. CAMERON

Standing Committees for 1963-64

Finance Committee

GEORGE E. KRUGER, *Chairman* — LYMAN H. HART, ROBERT M. GROGAN — F. S. TURNEAURE

Program Committee

DELOS E. FLINT — ROBERT H. CARPENTER, *Chairman* — ROBERT B. FULTON

Committee on Publications

CHARLES F. PARK, JR., *Chairman* — HAROLD M. BANNERMAN — JULIAN W. FEISS

Nominating Committee

ALFRED W. JOLLIFFE, *Chairman* — GILBERT H. ESPENSHADE — WARD C. SMITH

Admissions Committee

JAMES P. POLLOCK, *Chairman* — PHILIP W. GUILD — THOMAS D. MURPHY
PAUL A. BAILLY — ARCHIE F. MATHESON

Program Policy Committee

HAROLD M. BANNERMAN, *Chairman* — HERBERT E. HAWKES — HOLLIS G. PEACOCK
CHARLES H. BEHRE — ROGER H. MCCONNEL — A. E. WEISSENBORN

Auditing Committee

THOR H. KIILSGAARD — A. NELSON SAYRE

CONTENTS OF VOLUME 58

Number 1

Deposits of the Manganese Oxides: Supplement
D. F. Hewett, Michael Fleischer, and Nancy Conklin 1

The Low Temperature Synthesis in Aqueous Solution of Chalcopyrite and Bornite
W. M. B. Roberts 52

Jamaica Type Bauxites Developed on Limestones ..... *H. R. Hose* 62

Geology, Petrology, and Iron Deposits of the Guiana Shield, Venezuela .. *J. C. Stam* 70

The Peg Claims Spodumene Pegmatites, Maines ..... *H. W. Sundelius* 84

Geology and Mineral Deposits of East-Central Balabac Island, Palawan Province, Philippines ..... *T. U. John* 107

Sun Chart Compass Corrections for Reconnaissance Mapping and Geophysical Prospecting in Areas of Magnetic Disturbance ..... *D. C. Fraser* 131

Scientific Communication:

The Composition and Constitution of Red and Yellow Soil Earths that May be Substituted for Bauxite in Certain Industrial Operations ..... *L. M. Richard* 138

Discussions:

Age of Cornwall, Pennsylvania Magnetite Ore .. *W. D. Green and P. E. Damon* 143

Hydrothermal Versus Syngenetic Theories of Ore Deposition .... *Paul Gilmour* 145

Reviews:

Short Reviews of New Russian Books ..... *C. F. Davidson* 146

Geology of Ore Deposits, Vol. 3, No. 6, 1961 ..... *E. A. Alexandrov* 148

Gesteins- und Lagerstattenbildung im Wandel der wissenschaftlichen Anschauung (W. Fischer) ..... *Ervin G. Otvos* 155

The Sudbury Ores: Their Mineralogy and Origin (J. E. Hawley) 155

L'Évolution de la Lithosphère. Vol. IV. Glyptogénèse (H. and G. Termier) .. 156

Beryllium—Evaluation of Deposits During Prospecting and Exploration Work (A. A. Beus) 156

Books Received ..... *Charles D. Masters and Eric S. Cheney* 157

Society of Economic Geologists 161

Scientific Notes and News 165

Number 2

Studies of Fluid Inclusions II: Freezing Data and Their Interpretation
Edwin Roedder 167

Destructive Distillation of Carbonaceous Iowa Shales
L. K. Arnold and J. A. LaRose, Jr. 212

The Iron Ores of Cerro Bolivar, Venezuela ..... *John C. Ruckmick* 218

Geology of A.P.I. Project 49 Kaolin Clay Reference Locality, Mesa Alta, New Mexico ..... *C. C. Reeves, Jr.* 237

Bauxite Deposits of British Guiana and Surinam in Relation to Underlying Unconsolidated Sediments Suggesting Two-Step Origin
J. H. Moses and W. D. Michell 250
The Occurrence of Resinite in Bituminous Coals..*J. M. Jones and D. G. Murchison* 263
Analysis of Rocks and Minerals by Reflected Infrared Radiation
R. J. P. Lyon and E. A. Burns 274

Scientific Communications:
Source of Uranium in the Gas Hills Area, Wyoming.....*R. R. Guilinger* 285
Bauxite Genesis in Jamaica.....*L. J. Chubb* 286

Discussions:
Thermoelectricity and Resistivity of Pyrite from Renison Bell and Mt. Bischoff, Tasmania.....*J. F. Gilfillan* 290
Studies of the Oxidation of Magnetite and Goethite—A Reply
K. V. G. K. Gokhale 291
Hydrothermal Versus Syngenetic Theories: Post-Katanga Batholiths in Northern Rhodesia.....*K. A. Phillips* 292
The Reocim Deposits, Santander, Spain and Their Bearing on the Mississippi-Alpine Type of Lead-Zinc Deposit.....*O. Brotzen* 294

Reviews:
Geology of Ore Deposits, Vol. 4, No. 1.....*E. A. Alexandrov* 295
The Geological Aspects of the Origin of Life on Earth (M. G. Rutten)
C. F. Davidson 301
Sedimentary Petrography, 4th Edit. (Milner)..... 302
The Tectonics of the Canadian Shield (J. S. Stevenson, Editor)..... 302
Langenscheidt's New Muret-Sanders Encyclopedic Dictionary. Part I, English-German (O. Springer, Editor)..... 302
The Geology of Egypt (R. Said)..... 303
Books Received.....*Eric S. Cheney and Charles D. Masters* 303

Society of Economic Geologists..... 312

Scientific Notes and News..... 313

Number 3

Epigenetic, Diplogenetic, Syngenetic, and Lithogene Deposits.....*T. S. Lovering* 315
Mobilization of Iron by Alteration of Magnetite-Ulvöspinel in Basic Rocks in Missouri.....*G. A. Desborough* 332
Studies on Coal Macerals.....*M. M. Roy* 347
Studies of Fluid Inclusions III: Extraction and Quantitative Analysis of Inclusions the Milligram Range.....*Edwin Roedder, Blanche Ingram and W. E. Hall* 353
The Northern Rhodesian Copperbelt; Is It a Classic Example of Syngenetic Deposition?.....*J. L. Gillson* 375
The Rooiberg and Leeuwpoort Tin Mines, Transvaal, South Africa
A. Leube and E. F. Stumpfl 391
Occurrence and Geochemistry of Ground Water in the Coastal Region of Midnapur, West Bengal, India.....*B. B. S. Singhal* 419
Microscopic Examination of Manganese Ores of Srikakulam and Visakhapatnam (Vizagapatam) Districts, Andhra Pradesh, India.....*J. S. R. Krishna Rao* 434

Scientific Communications:
A 'Three Point' Method of Orienting Underground Specimens..*E. L. Faulkner* 441

Discussions:
Hydrothermal vs. Syngenetic....*M. E. Woakes* 444
Carbonatites....*Nicolas de Kun* 446
Hydrothermal Versus Syngenetic Theories of Ore Deposition....*W. G. Garlick* 447
Bolivian Tin Mineralization and Orogenic Evolution
Alexander Schneider-Scherbina 456
Reviews:
Short Reviews of New Russian Books....*C. F. Davidson* 460
Geology of Ore Deposits, Vol. 4, No. 2....*E. A. Alexandrov* 462
Map of the Mineral Deposits of France....*D. R. Derry* 469
Theoretical Petrology, 2nd Edit. (T. F. W. Barth).... 469
Geochemistry in Mineral Exploration (H. E. Hawes and J. S. Webb).... 469
Geological Survey Research 1962.... 470
Theory of Ground Water Movement (P. Ya. Polubarinova-Kochina).... 470
Books Received....*Charles D. Masters and Eric S. Cheney* 470
Scientific Notes and News.... 476

Number 4

Brief Comments on the Art and Science of Economic Geology....*Olaf N. Rove* 477
Mineral Assemblages in Sulfide Ores....*Hugh McKinstry* 483
Distribution of Radioactivity in the Mosaboni Copper Mine, Bihar, India
E. V. Gangadharam, K. Kameswara Rao, and U. Aswathanarayana 506
The Relation of Iron and Manganese in Sedimentary Iron Formations..*Henry Lepp* 515
The Rooiberg and Leeuwpoort Tin Mines, Transvaal, South Africa. Part II. Petrology, Mineralogy and Geochemistry....*A. Leube and E. F. Stumpfl* 527
Some Basic Considerations in the Application of Infrared Spectroscopy to Mineral Analysis....*Hans H. Adler* 558
The Manganese Ores of Kutingi Mines, Koraput District, Orissa, India
A. Sriramadas 569
Dithizone Field Tests....*H. E. Hawkes* 579
Touramaline Greisenization in Langkawi, Northwest Malaya
C. S. Hutchison and J. H. Leow 587
Data on Cuprian Coloradoite from Kalgoorlie, Western Australia..*Arthur S. Radtke* 593
Scientific Communications:
Stability Relations of Some Arsenates of Zinc and Calcium....*S. A. Williams* 599
"Aureole" versus "Halo"....*S. I. Tomkieff* 601
Chemical Kinetics and the Formation of Mineral Deposits....*D. R. Swayze* 604
Lead Mineralization in the Abbottabad Area, Hazara District, West Pakistan
F. A. Shams 605
Discussions:
Hydrothermal versus Syngenetic Theories of Ore Deposition
J. Gotthard Schmitz 609
Hydrothermal vs. Syngenetic Theories of Ore Deposition....*J. F. R. Askew* 614
A Proposed Classification of Copper Deposits....*Paul Gilmour* 618
A Simplified Stereographic Projection Solution of the Two Drillhole Problem
Joseph W. Mills 618
Society of Economic Geologists: Canadian Newsletter....*J. M. Harrison* 622

Reviews:
Geology of Ore Deposits, Vol. 4, No. 3.....*Eugene A. Alexandrov* 625
Osnovy Tektoniki Kitaka.....*C. F. Davidson* 631
Stratiform Copper Deposits in Africa (Lombard and Nicolini, Editors)
Nicholas De Kun 632
Urans—Geochemie und Lagerstättenkunde (Josef Dybek)..... 634
Basic Problems in Geotectonics (V. V. Beloussov)..... 634
Books Received.....*Eric S. Cheney and Charles D. Masters* 634
Scientific Notes and News..... 642

Number 5

Some Vein-Wall Rock Relationships in the White Pine Mine, Ontonagon Co., Michigan.....*R. H. Carpenter* 643
Phase Equilibria in the System Cu-Fe-As-S.....*L. B. Gustafson* 676
Geology and Technology of Some Natural Pozzolans in North Central California
J. N. Faick 702
Relationship Between Sulfur in Coals and the Occurrence of Marine Roof Beds
E. G. Williams and M. L. Keith 720
Host Rock As a Source of Magnetite Ore, Scott Mine, Sterling Lake, N. Y.
A. F. Hagner, L. G. Collins, and C. V. Clemency 730
Kaolin in Ceylon.....*J. W. Herath* 769
The Mineralogenetic Provinces of Africa.....*Nicolas de Kun* 774
A New Technique for the Laboratory Coring of Coal....*J. M. Jones and J. A. Bell* 791

Scientific Communications:
Mineralization in Cook County, Minnesota.....*R. L. Foster* 796
Thermal Glow Tests As a Guide to Ore Deposits.....*Günter Zeschke* 800

Discussions:
The Origin of the Gold-Quartz Deposits, Yellowknife, N.W.T.
R. W. Boyle, R. K. Wanless, and J. A. Lowdon 804
Facies and Types of Hydrothermal Alteration..*J. J. Hemley and P. B. Hostetler* 808
Two More Solutions of the Two Drill Hole Problem
J. W. Ambrose and H. C. Carswell 811
The Use of Thermodynamics Laws for the Explanation of Mineral Zoning
A. A. Kudenko and V. P. Stetsenko 815
Jamaica Type Bauxites Developed On Limestones.....*Bahngrell W. Brown* 816

Review:
Geology of Ore Deposits, Vol. 4, No. 4.....*E. A. Alexandrov* 818
Relation of Ore Deposition to Doming in the North American Cordillera (E. Wisser)..... 825
Structural Geology of North America, 2nd Edition (A. J. Eardley)..... 825
Reconnaissance Geology of Part of West Pakistan..... 826
Geological Survey Research 1962..... 826
Russian-English Dictionary, 2nd Edition (L. I. Callahan and E. B. Uvarov).... 826
A Survey of the Mineral Industry of Southern Africa (R. B. Toombs)..... 827
Books Received.....*Charles D. Masters and Eric S. Cheney* 827

Society of Economic Geologists: South African Newsletter.....*B. B. Brock* 834

Scientific Notes and News..... 838

Number 6

Concepts of Genesis of Sandstone-Type Uranium Ore Deposits.....*H. H. Adler* 839
The Sulfur-Rich Portion of the Fe-Ni-S System.....*L. A. Clark and G. Kullerud* 853
Composition of Fluid Inclusions, Cave-In-Rock Fluorite District, Illinois, and Upper Mississippi Valley Zinc-Lead District.....*W. E. Hall and Irving Friedman* 886
Chemistry and Petrography of the Marl Slate of S. E. Durham, England *D. M. Hirst and K. C. Dunham* 912
Distribution of Fluorine in Unaltered Silicic Volcanic Rocks of the Western Conterminous United States.....*R. R. Coats, W. D. Goss, and L. F. Rader* 941
Silver-Gold Ratios in Some Witwatersrand Conglomerates.....*R. B. Hargraves* 952
Magmatic Sphalerite in Missouri Basic Rocks.....*G. A. Desborough* 971
Structural Geology of Pulacayo Mine, Bolivia.....*W. A. Lyons* 978

Scientific Communications:
Average Chemical Composition of Carbonatites.....*D. P. Gold* 988
Bacterial Action on Orpiment.....*H. L. Ehrlich* 991
Use of Radiation Surveys on Non-Radioactive Deposits Formed by Descending Solutions.....*Günter Zeschke* 995

Discussions:
The Ore Knob Massive Sulfide Copper Deposit, North Carolina: An Example of Recrystallized Ore.....*R. W. Hutchinson* 997
A Further Remark on Biogenic Sulfides: Inorganic Pyrite Spheres *Klaus Steinike* 998
Toxic Properties of Several Organic Solvents Used in Geochemical Exploration *Harold Bloom* 1000
Genesis of Bauxite Deposits in Surinam and British Guiana...*D. R. de Vletter* 1002
A Reply.....*J. H. Moses and W. D. Michell* 1007

Reviews:
Geology of Ore Deposits, Vol. 4, No. 5, 1962.....*E. A. Alexandrov* 1009
Economic Geology U.S.S.R., Nos. 1–2, 1960..... 1015
A Study of Pyrochlore (A. H. Van Der Veen)..... 1015
1961 Minerals Yearbook..... 1016
Journal of Hydrology, Vol. 1, No. 1..... 1016
Stratigraphic History of Africa South of the Sahara (S. H. Haughton)..... 1016
The Geology of Africa (R. Furon)..... 1017
Books Received.....*Eric S. Cheney and Charles D. Masters* 1017

Society of Economic Geologists..... 1025

Scientific Notes and News..... 1035

Number 7

Manto Deposits of Fluorspar, Northern Coahuila, Mexico *A. K. Temple and R. M. Grogan* 1037
Ore Solution Chemistry. I. Experimental Determination of Mineral Solubilities *H. L. Barnes* 1054
Distribution of Metals in the Don Tomas Vein, Frisco Mine, Chihuahua, Mexico *G. S. Koch, Jr., and R. F. Link* 1061
A Re-Examination of Some Suggested Mechanisms for Remobilization of Sulfide Orebodies.....*A. H. Sorensen* 1071

Petrology of Talcher Coals.....*H. S. Pareek* 1089
Hydrothermal Developments in the Andes.....*Paul Kents* 1110
Oxidation of Sulfide Ores in the Mildren and Steppe Mining Districts, Pima County, Arizona.....*S. A. Williams* 1119
Copper, Lead and Zinc in Biotites from Basin and Range Quartz Monzonites
W. T. Parry and M. P. Nackowski 1126
Formation of Ore Deposits by Water of Compaction.....*E. A. Noble* 1145

Scientific Communications:
Fractures, Joints, Faults, and Fissures.....*T. W. Mitcham* 1157

Discussions:
The Ore Knob Massive Sulfide Copper Deposit, North Carolina
A. R. Kinkel, Jr. 1159
Bauxite Deposits of British Guiana and Surinam in Relation to Underlying Unconsolidated Sediments Suggesting Two-Step Origin
G. Doeve and W. O. J. Groeneveld Meijer 1160
Thermoelectricity and Resistivity of Pyrite from Renison Bell and Mt. Bischoff, Tasmania.....*P. A. Hill and Ronald Green* 1162
Synthetic and Natural Phases in the System AU-AG-TE.....*P. L. Cloke* 1163

Reviews:
Short Reviews of New Russian Books.....*C. F. Davidson* 1167
Geology of Ore Deposits, Vol. 4, No. 6.....*E. A Alexandrov* 1169
Iron-Ore Deposits of Bihar and Orissa and Planning for Their Development
A. K. Snelgrove 1174
Beryllium and Uranium Mineralization in Western Juab County, Utah. Guidebook to the Geology of Utah, No. 17.....*A. W. Pinger* 1176
Introduction Geology. Volume 1, Principles (Read and Watson)..... 1176
Books Received.....*Charles D. Masters and Eric S. Cheney* 1177

Society of Economic Geologists: New York Meeting, November, 1963..... 1180

Scientific Notes and News..... 1194

Number 8

Silver Mineralization in the Mineral District, Washington County, Idaho
A. L. Anderson 1195
The Application of Thermoluminescence to Geothermometry....*R. A. MacDiarmid* 1218
Kinetics of a Replacement Reaction.....*L. L. Ames, Jr.* 1229
Heavy Mineral Reconnaissance Florida West Coast.....*J. D. Bates* 1237
Principles of Geostatics.....*G. Matheron* 1246
Critical Factors in the Genesis, Extent, and Grade of Some Residual Bauxite Deposits.....*P. L. C. Grubb* 1267
Economic Geology of a Part of the Hillsboro, New Mexico, Mining District
C. C. Reeves, Jr. 1278
Geology and Origin of Sangdong Tungsten Mine, Republic of Korea..*Yong Won John* 1285
A Geochemical Approach to the Problem of Bauxite Genesis in British Guiana
G. Harden and J. H. Bateson 1301
Additional Measurements of Rotation Properties of Ore Minerals
R. H. Carpenter and E. N. Cameron 1309
Orientation of Small Diameter Drill Core.....*P. W. Zimmer* 1313

A New Nomogram for the Solution of Problems in Structural and Economic Geology.....*G. W. Leney* 1326

Scientific Communications:

Molybdenite Paragenesis at the LaCorne Mine, Quebec.....*J. R. Renault* 1340

Discussions:

Vein-Wall Rock Relationships, White Pine Mine.....*I. B. Joralemon* 1345
Hydration Energy—A Possible Contributor to Crustal Heat.....*R. B. Cate, Jr.* 1346
Studies on Coal Macerals.....*Bankim Mukherjee* 1347
Bolivian Tin Mineralization.....*Pontus Ljunggren and Luigi Radelli* 1348

Reviews:

Short Reviews of New Russian Books.....*C. F. Davidson* 1352
Das Uran und seine Geschichte (F. Kirchheimer).....*C. F. Davidson* 1354
Geology of Ore Deposits, Vol. 5, No. 1.....*E. A. Alexandrov* 1355
Books Received.....*E. Julius Dash, Roger Hart and Charles D. Masters* 1361

Society of Economic Geologists—SEG Program, February, 1964..... 1368

Scientific Notes and News..... 1372

Index, Volume 58.....*Robert B. McGraw, Jr.* 1373

Contents, Volume 58..... iii